ISSUE 194 NOVEMBER 2009

Better Homes and Gardens®

WOOD®

The World's Leading Woodworking Resource

BEST SAW BLADES UNDER $50! p.58

Build This Classic Dovetailed Blanket Chest p.30

14 Router-Bit Setup Secrets p.50

Projects for Gift Giving

- Mantel Clock p.54
- Toy Excavator p.62
- Bud Vase p.28

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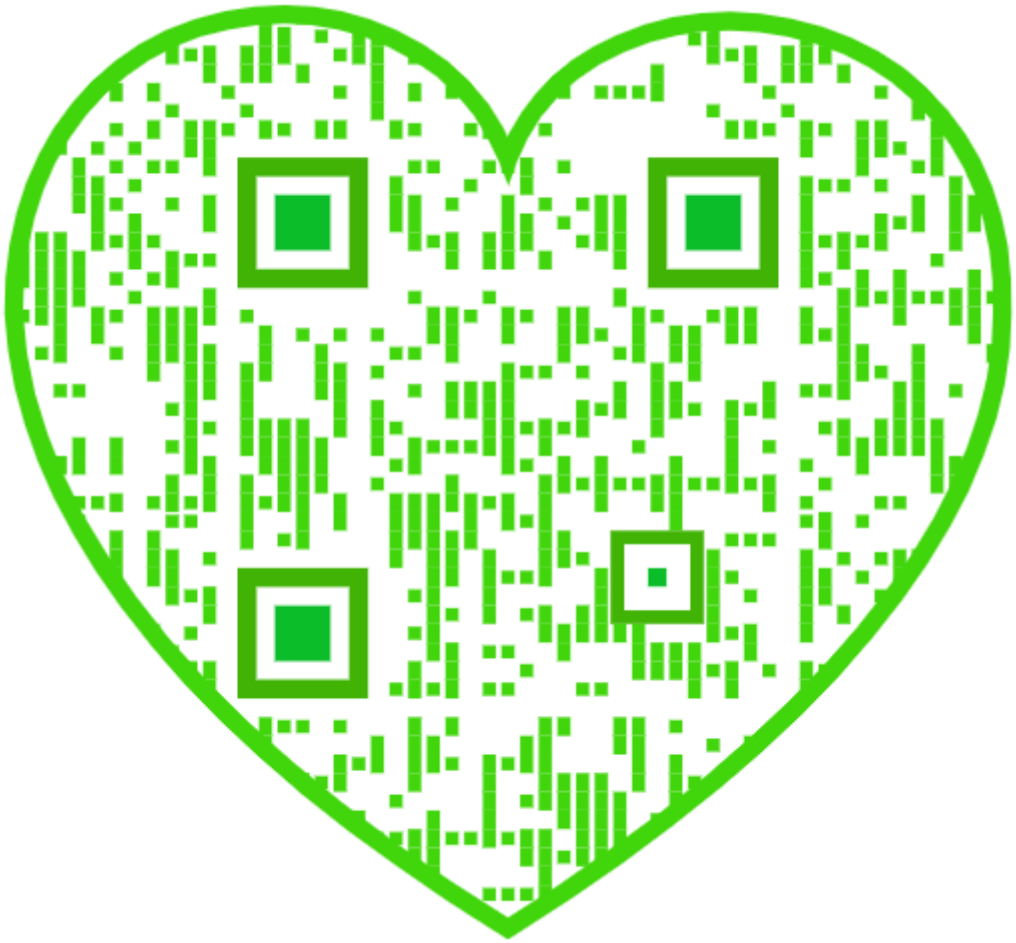

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- Cutterhead speed: 6500 RPM
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- Planer feed rate: 16 FPM
- Approx. shipping weight: 378 lbs.
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- Precision ground cast iron table size: 19¾" x 14¾"
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- Rabbeting capacity: ½" • Max. depth of cut: ⅛"
- Cutterhead knives: 4 HSS
- Cutterhead speed: 5500 RPM
- Deluxe cast iron fence size: 38"L x 1¼"W x 4"H
- Approx. shipping weight: 558 lbs.

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- Rabbeting capacity: ½" • Max. depth of cut: ⅛"
- Cutterhead speed: 5000 RPM
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- Built-in mobile base
- Approx. shipping weight: 556 lbs.

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- Max. cutting height: 6"
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- Feed rate: 16 & 30 FPM
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- Min. board length: 6"
- Min. board thickness: ⅛"
- Sanding drum size: 4"
- Dust collection port: 2¼"
- Approx. shipping weight: 354 lbs.

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G0458

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This seal is your assurance that we build every project, verify every fact, and test every reviewed tool in our workshop to guarantee your success and complete satisfaction.

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ENTER BEFORE NOV. 30 TO WIN $1,000

WOOD® Magazine's WOODWORKING SHOWDOWN ONLINE PROJECT CONTEST

You still have time—but not much—to post photos of your shop or best projects and win a tool prize worth more than $1,000. Starting December 1, woodworkers vote online to choose the winners in each of six project categories. Learn more at woodmagazine.com/showdown.

"NAME THAT POWER TOOL" FUN QUIZ

It may be the most enjoyment you can have without getting glue on your fingers. WOODTube user Steve in Marin put together an interactive quiz at woodmagazine.com/namethattool that has you identifying power tools by only their sounds. Bet you can't get all 10 right on the first try...

NEW VIDEOS: HELP AROUND THE HOUSE

You're great in the shop, but how about when it comes to plumbing, wiring, or other home honey-do chores? At woodmagazine.com/homehowto, you'll find dozens of downloadable videos that show you how to do those home repairs and improvements.

MAKE SMART TOOL BUYS

Before you buy another woodworking tool or accessory, get expert buying advice from the editors of *WOOD* magazine. Just visit woodmagazine.com, then click on "Tool Advice" near the top of the page. There you'll find our picks for the Top Tools and Top Values in more than 30 product categories.

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Marlen and his daughter, Chelsy, made this dresser and finished it with thinned black enamel.

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Craig designed and built this TV cabinet for his family room using cherry and stained poplar.

Jeff relaxes in the Morris chair and ottoman he built for his home.

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In Memoriam — E.T. Meredith III (1933–2003)

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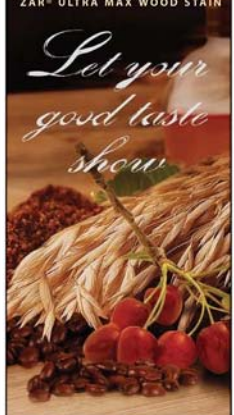
ZAR® ULTRA MAX WOOD STAIN



ZAR® ULTRA MAX OIL MODIFIED WOOD STAIN interior formula applies easily and penetrates evenly to achieve a rich, uniform color. It is ideal for furniture, hardwood floors, woodwork and wood, metal or fiberglass doors.

Core/Shell Technology provides the deep tones of an oil-based stain with the low odor, fast drying and easy clean-up of a water-based stain.

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With its delicious new colors, Ultra Max Wood Stain gives you a great look that is also good for the environment.

Sounding Board

Our bulletin board for letters, comments, and timely updates

Try high-yielding cypress for outdoor projects

After reading the article "From Knotty to Nice" in issue 190 (May 2009), I want to recommend cypress as another good wood choice for outdoor projects. I live near dozens of mushroom growers who build their growing racks from cypress because of its excellent resistance to rot in that humid environment. Cypress is relatively straight grained and often knot-free. Native to the southeastern United States, cypress might cost a little more than cedar in some parts of the country, but that cost can be offset by the high yield of each board. I buy it "green" and then air-dry it to save money.

— Tom McAvoy, Newark, Del.

Turn your best project and technique ideas into CA$H!

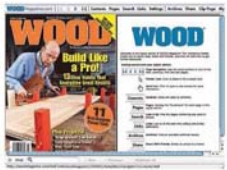
Have you designed and built a project that you feel other *WOOD*® magazine readers would enjoy building? We're talking big or small projects, simple or complex, for the home, deck, garden, or shop. Have you come up with a clever time- or money-saving alternative for getting great results in your shop—perhaps a smarter or safer way to machine parts, cut joints, or get an eye-catching finish (just to name a few)?

If so, please take a few minutes to tell us about your project or technique. You can earn up to several hundred dollars if we publish your idea. (And, of course, you'll be the envy of your woodworking buddies.)

Simply send up to five photos and describe your project or technique in 100 words or less. If we choose your idea we'll get back to you for more information, so don't forget to include your e-mail address and daytime phone number.

Send your materials via e-mail to: woodmail@woodmagazine.com; or write to WOOD magazine, 1716 Locust St., LS-221, Des Moines, Iowa 50309.

—WOOD magazine editors



Readers approve of digital *WOOD*® magazine editions

Thank you for putting online the digital version of *WOOD* magazine. Now I can make the type as large as I want, and print out only those articles that need to go out to the shop. I still like the ink-on-paper version as well, and plan to make good use of both.

—Bill Tesh, New Goshen, Ind.

I want to say how impressed I am with the electronic version of your magazine. The content is organized in an easily accessible format and the user-friendly navigation buttons make it easy even for those of us who are not so computer-savvy.

—Mike Tetrault, Dover Centre, Ont.

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—WOOD magazine editors

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—WOOD magazine editors

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Shop Tips

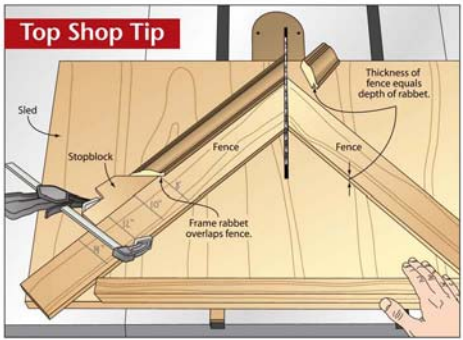
Helping you work faster, smarter, and safer

No-guesswork frames with mitersled modification

If you've ever tried to make picture frames, you understand the challenge of sizing the frame members to fit your photos. That's because the critical measurement is the length of the rabbet on the back of the frame—hidden when cutting—making it hard to size the frame sides accurately.

But this specialized miter sled makes it easy. The key to how it works: The thickness of the fences matches the depth of the picture frame rabbet. The rabbet overlaps the fence during the cut. Make the first cut on the right side of the fence; then switch to the left to cut it to final length. For even more efficiency, measure from the saw kerf and mark common image sizes on the left fence, as shown. Then just align the frame stock so the rabbet crosses the fence at the correct mark and cut. This ensures that the frame accomodates the picture. I've even created an angled stopblock that clamps onto the fence for making multiple frames of the same size.

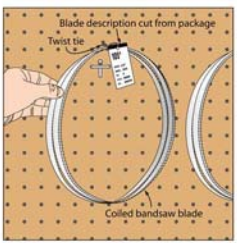
—Brent Hill, Alpine, Utah



Bandsaw blade badge preserves particulars

To remember the stats (size, width, teeth per inch) of your replacement bandsaw blades, cut the info from the box and affix it to the coiled blade using a twist tie. When you install the blade in the saw, hang the tag from the bandsaw's door handle. It's a helpful reference when you frequently change blades for different uses.

—Kevin Hemmingsen, Wabasha, Minn.



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The Top Tipster

Photo: Joel Jenkins

Brent Hill only reluctantly admits that he managed software projects for the IRS. "I usually just say, 'I worked for the government.' My woodworking projects are a lot more fun." Now retired, Brent has refocused his energies on picture framing. With 12 grandchildren, he gets lots of use from his tool-winning jig, *left*.

For sending in this issue's Top Shop Tip, Brent receives a JDS Air-Tech 750-ER air filtration system. Great job, Brent!

Top tips earn tools!

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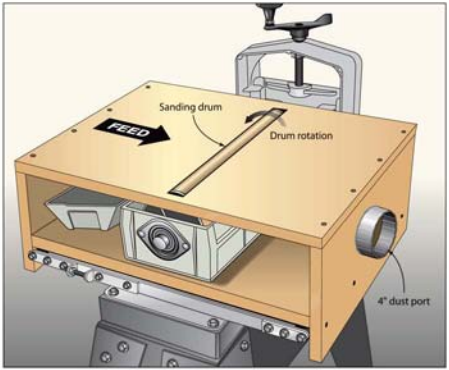
Drum sander adapter breaks thickness barriers

I love my drum sander for thicknessing lumber and leaving a smooth surface. But sometimes, I want the same finish on workpieces larger than the machine's 3" maximum thickness, such as when sanding dovetails flush on a drawer. So, I adapted my drum sander to sand on the top of the drum by constructing the box you see at *right*. It just fits the bed, with the ends protruding down to keep it from moving. It's high enough to accommodate the opened sander.

To create the slot for the drum, I installed 36-grit paper, clamped the box in place, turned on the drum (but not the feed belt) and raised it until it touched the underside of the tabletop—just enough to leave a mark. Then, I removed the top, and routed ¼×1" slots through the top at either end of the mark to accommodate the exposed ends of the drum where the sandpaper doesn't reach. I replaced the top and slowly raised the sanding drum until it protruded slightly from the top.

—Paul Milo, Glendale, Ariz.



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Magnet, tape, and glue affix brush

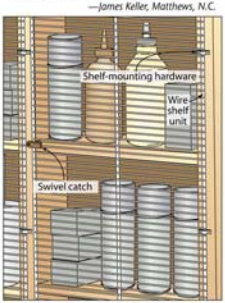
I use disposable metal-handled brushes to spread glue on woodworking joints, but I always seem to knock the brush off the bench and into the sawdust at the worst possible times. My solution: Tape a small magnet to the glue bottle with masking tape. The brush can't roll away, and the bristles stay clean of debris.

—James Sullivan, Washington, N.C.

Shelves secure shelves

I installed shelving between the open studs of my garage shop to take advantage of the unused space. This leaves everything in open view and easy to spot. However, it also leaves solvents and finishes within reach of small hands so I needed a way to childproof them. That's when I found wire closet shelving at the home center. It comes in 16" widths—the same as standard stud spacing—and can be "hinged" using the included hardware, as shown. They can be locked in an out-of-reach spot with a simple swivel catch or an eye hook lock.

—James Keller, Matthews, N.C.



continued on page 12

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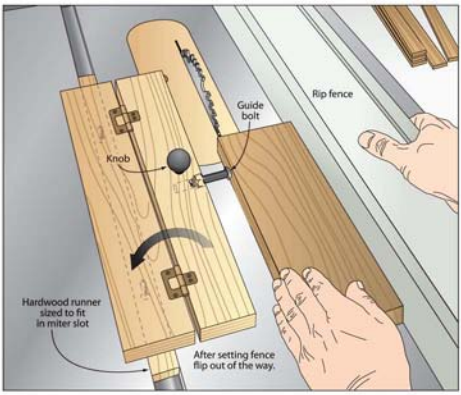
Just flip and rip with this thin-strip tip

As I was making the thin-strip ripping guide from the November 2008 issue of *WOOD®* magazine (no. 187, page 63), I saw an opportunity to improve its efficiency. After attaching the miter-slot runner to the board, I ripped the board in half, and then reattached the two halves with hinges before adding the nut and guide bolt that acts as a stop. With the strip width set, I position the tablesaw fence and flip the jig guide out of the way to make the cut. I flip the guide back down again to position the workpiece and fence for the next cut. The knob on the hinged guide simply makes it easier to flip.

—Oneil Long, Mound City, Mo.



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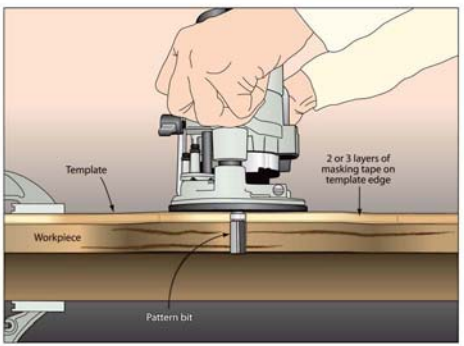
Unmasking a burn-free edge

Your recent article on removing router burn marks (July 2009, no. 191, page 22) was very helpful. Here's the method I use when template routing.

After cutting close to the traced template line with the bandsaw, I apply two or three layers of masking tape to the edge of the template before affixing it to the workpiece. After using a pattern bit to make an initial pass, I remove the masking tape and make a final shallow pass with the router, eliminating any burn marks.

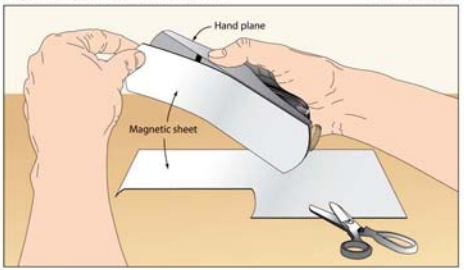
—Everett Blair, Seminole, Fla.



I'm a sole magnet!

To protect the blade and sole of your hand planes when not in use, pick up a sheet of magnetic air duct grill cover from the hardware store. Trace the shape of the plane sole on the magnetic sheet and cut it out with scissors. Your new magnetic cover shields the blade and sole from bumps and jostles, even in the bottom of a toolbox.

—Gary Walsh, Elgin, Ill.



continued on page 15

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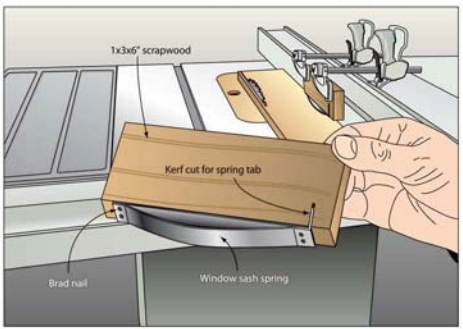
WD1109

Spring-enhanced hold-downs

I use this jig in place of a featherboard hold-down on my tablesaw and router table because it's inexpensive and easy to make. To build one, you'll need an inexpensive window sash spring. You can get them for about $3/pair at the hardware store. Cut a small kerf in a 1×3×6" scrap of wood to accommodate the tab. Then attach the sash spring with brad nails. Clamped to your fence the spring action holds the workpiece securely against the table during feeding.

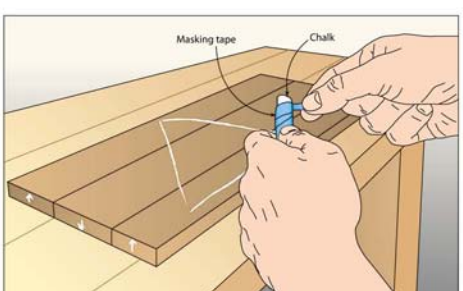
—Dale Robbins, Stockton, Calif.



Childish solution to brittle chalk

Growing tired of my chalk breaking when I tried to mark on rough surfaces, I took a lesson from children's crayons. I wrapped masking tape around the chalk to reinforce it. After the chalk wears down, I just tear off a little tape to expose more. Works like a charm.

—Jose Salazar, Indian Springs, Nev.



He's a tough guy. But you can see right through him.

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Aromatic Cedar

Moth Prevention Miracle or Myth?

Aromatic eastern red cedar (*Juniperus virginiana*) has been the traditional choice for blanket chests and closet linings for generations because of its purported moth-repellant properties and fresh smell. Is it a miracle wood or too good to be true?

Mothbusters?

Two culprits commonly damage cloth: the casemaking clothes moth, shown *below*, and the webbing clothes moth. These reclusive, small critters (about ¼" long with a ½" wingspan) don't resemble your standard porch-light moths. If you see them at all, it may already be too late to save your sweaters because it's the larvae, rather than the adult moths, that munch on wool, fur, and feathers.

So how does aromatic cedar contribute to your pest-control solution? When concentrated in a tightly-sealed space, such as a blanket chest, the vapors from this wood species will kill hatching moth larvae. But those vapors have little or no effect on larger larvae, adult moths, or eggs, and less effect still in wide-open areas, such as closets.

That said, it has been found that aromatic cedar blocks bugs no better than simply sealing uninfested clothes in a plastic container or bundling them in taped-up butcher paper.

Skip the finish

Top-coating aromatic cedar seals in, and therefore negates, its insect-repellent properties. But you should also avoid applying any stain, paint, or finish to the non-cedar interior surfaces of a cedar chest. That's because the resins in cedar share characteristics with turpentine, and the solvent-like vapors can cause oil- and water-based stains, paints, and finishes to soften, making lids (and clothes) stick. If you include the optional cedar tray in the blanket chest on *page 30*, leave the interior unfinished.

The cedar-lined bottom line

If you want to give your blanket-chest project a traditional look (and smell), search no further than aromatic cedar. However, as a pesticide, aromatic cedar makes a better preventative medicine than it does an ultimate cure. So don't expect miracles.

LIFE AND TIMES OF THE MOTH

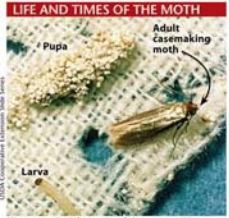

Photo: Clemson University—USDA Cooperative Extension Slide Series

Shown is the life-cycle of the casemaking clothes moth from larva to pupa to adult. If you see them in any of these stages, aromatic cedar will offer little protection.

RESAND FOR A REFRESH

Aromatic cedar loses both its smell and insect-repellent properties after a year or two. Occasional sanding restores cedar's effectiveness for several years.

A BARRIER OF PROTECTION

A sacrificial towel between the cedar and your clothes protects against oil and pitch stains while still allowing the wood's protective vapors to circulate.

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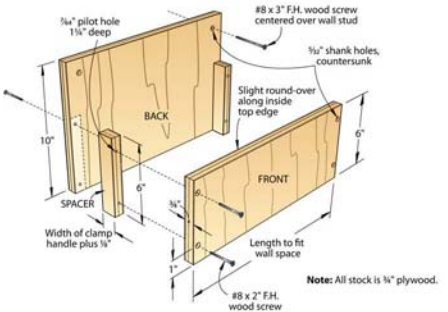
Clamp Rack

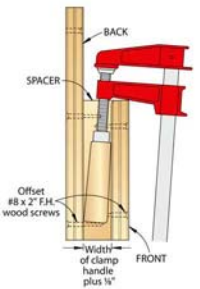
When we first ran across this clamp-rack design, we did a bit of a double take. It holds clamps by their handles, not by the fixed jaws, as we'd seen countless times. With this "backward" design, clamps can't fall off the rack, and it keeps the movable jaw from sliding down the bar when hung.

The key to building this clamp holder is to minimize the gap between the front and back pieces. The tighter the opening around the clamp handle, the more vertical a clamp will hang—a ⅛" gap works well. A slight round-over along the top inside edge of the front minimizes marring the clamp-handle finish when hanging the clamps.

Project design: **Tyme, San Diego, Calif.**

Note: *Preview Tyme's shop as well as those of 12 other top-shop owners by visiting* woodmagazine.com/ABHW2009





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Editor rating: ★★★★★

Editor test-drive:

Before testing this set, I used a generic, inexpensive set of Forstner bits in my shop, and got along fine. But what a difference when I began using Freud's Italian-made bits! It's amazing how my ordinary, cheap bits lulled me into accepting a little tear-out here or a little burning there. With a unique wavy-edge rim design, these bits never tore out any of the woods that I used for testing, including pesky veneered plywood and MDF. The wavy edges cut so smoothly and cleanly and required so little effort that it surprised me. They also cut flawlessly on angled-entry holes.

To learn more:
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—Tested by Chuck Hedlund

13 years as Master Craftsman at *WOOD* magazine, 35 years of professional woodworking experience

LEE VALLEY, #06J80.13, $79

13 bits:
¼" to 1" in 1/16" increments

Editor rating: ★★★★

Editor test-drive:

Except for the 1⅛" bit I use for cup hinges, I rarely use Forstner bits larger than 1". So this set of small bits, made in China, suits me just fine, even though I can get more bits for less money elsewhere. These high-speed-steel, smooth-rimmed bits proved sharp and accurate as they bored crisp, tear-out-free holes in oak, walnut, fir, birch plywood, and MDF. They make perfect flat-bottom holes, with only a ⅛"-deep divot from the center spur. I also tested Lee Valley's 16-piece set of sawtooth bits (1⅛ to 3" by ⅛" increments, $250, #06J80.16), and they performed equally well.

To learn more:
800-871-8158; leevalley.com

—Tested by Kevin Boyle

8 years as an editor at *WOOD* magazine, 22 years of woodworking experience

WOODLINE USA, #WL-FR2000, $65

20 bits:
¼" to 1" in 1/16" increments; 1⅛" to 2" in ⅛" increments

Editor rating: ★★★

Editor test-drive:

In the past, I've bought Forstner bits like router bits: One at a time, as needed. But for the price of a half-dozen individual bits, I got Woodline's China-made 20-piece set. The 12 bits smaller than 1" feature smooth cutting rims, while the larger ones have a sawtooth design. Both types cut cleanly with no tear-out as I bored holes in pine, birch plywood, white oak, and even tough-as-nails hickory. As a bonus, the titanium-nitride coating helps reduce dulling from heat buildup. They also have hex-tipped shanks for a no-slip grip in the chuck, with the recommended speed printed on the shank.

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How to Redo a Misassembled Drawer

Don't get bent out of shape over an out-of-square drawer. You've got one last shot at achieving a first-rate fit.

That's some magic trick your newly built drawer pulled—levitating one of its corners off your workbench [**Photo A**]. Before you make the whole drawer disappear, try this technique for separating and reassembling the drawer.

Your lucky break

Separating a glue joint by force works best if you catch the problem before the glue cures completely, so check drawers for flatness and square as soon as you remove the clamps. You have two options for weakening glue joints. To soften type-1 (non-water-resistant) yellow glue, thoroughly soak the joint with vinegar until you feel the connection flex. For type-2 or type-3 yellow glues, repeatedly soak the joint with acetone in a well-ventilated area. For an odor-free alternative way to soften all three types, heat the joint with a hair dryer [**Photo B**].

Immediately after softening the joint, clamp one side to your bench, place a scrap block against the joint, and strike the block with just enough force to separate the parts, as shown *above*. Repeat for the remaining joints, soaking or heating one and separating it before moving on to the next.

Once separated, sand the joint parts smooth without sanding to bare wood, which can throw off the fit. Remove any glue build-up within dadoes and rabbets that would affect reassembly, then sand end grain smooth.

Drawer assembly, take two

To avoid repeating the same mistakes, check drawer parts for identical lengths of opposite parts, such as sides. Check that dadoes and rabbets on all opposite parts were cut the same. Then use a straightedge to ensure your bench top rests dead flat. If it's not flat, do the reassembly work on your tablesaw top—provided it's flat.

The first glue-up filled the wood pores, so switch to a non-penetrating adhesive, such as 30-minute epoxy. Assemble the drawer and clamp the sides, front, and back as you normally would. This time, though, add two more clamps to hold the drawer assembly against your flat work surface [**Photo C**]. Then check for square.

DRAWERS CAN DO THE TWIST

When a drawer corner does this as you hold the other three corners flat against a work surface, it's time to try again.

SOFTEN GLUE WITH HEAT

Heating type-1 yellow glue above 130° and type-2 or -3 glues above 175° softens them for easier disassembly.

TAKE 2: CLAMP THE DRAWER FLAT

By assembling the drawer at the corner of your workbench, you can add clamps to hold the glue-up flat against the work surface.

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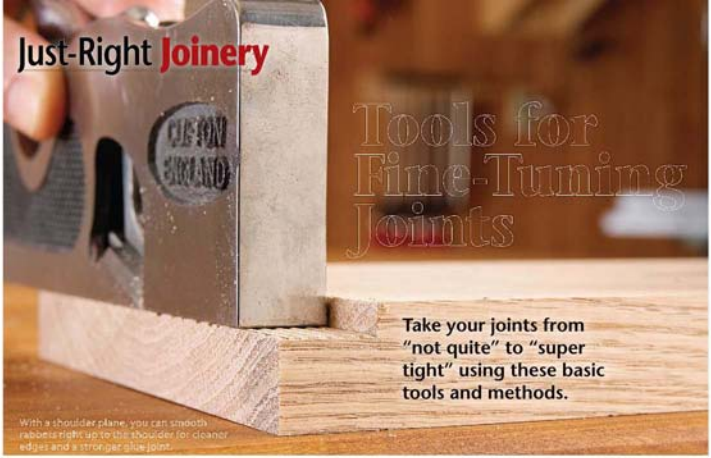
Tools for Fine-Tuning Joints

Take your joints from "not quite" to "super tight" using these basic tools and methods.



With a shoulder plane, you can smooth rabbets right up to the shoulder for cleaner edges and a stronger glue joint.

Machines cut joints fast, but not always accurately. That's the time to bring in hand tools because sanding blocks, chisels, and planes remove wood in thousandths of an inch for a snug joint [**Photo A**].

If you don't have a block plane or shoulder plane, don't rush out and buy them—yet. Start simple with a sanding block you can make for pennies using scraps, sandpaper, and spray-adhesive. Then add a good set of bevel-edge bench chisels. As your joinery skills improve, save time by supplementing your sanding blocks with well-honed block and shoulder planes.

Sanding blocks: Slow but simple

Uses: Reduce tenon thickness by sanding the cheeks, and make the shoulders even with each other [**Photo B**]; smooth scoring from tablesaw-cut rabbets or dadoes or stub-tenon grooves for cleaner edges and a stronger glue joint [**Photo C**]; and adjust half-lap depths to make parts flush. For a curved sanding block to fine-tune coped ends on molding, wrap sandpaper around dowels of different sizes.

Success secrets: Match the grit to the amount of stock to remove—start at 80 grit for removing deep score lines; 120 grit works great for minor tenon corrections. Then match the block size to the job. For example, plane a scrap block to the thickness of your dado widths; then mount sandpaper to the edge for a sanding block that works the entire dado with each pass [**Photo C**]. Choose hardwood sanding-block stock that will hold a crisp edge, and attach sandpaper to only one surface, not adjoining faces or edges. That lets you adjust one dimension of a joint without affecting the others [**Photo B**]. Abrasives on small sanding blocks wear in a hurry, so change paper frequently.

continued on page 26

THIN ENOUGH TO SEE THROUGH

A

"Paper-thin" takes on new meaning with a well-tuned plane. This shaving thickness equals that of the paper on this page.

SAND TENON SHOULDERS FLAT

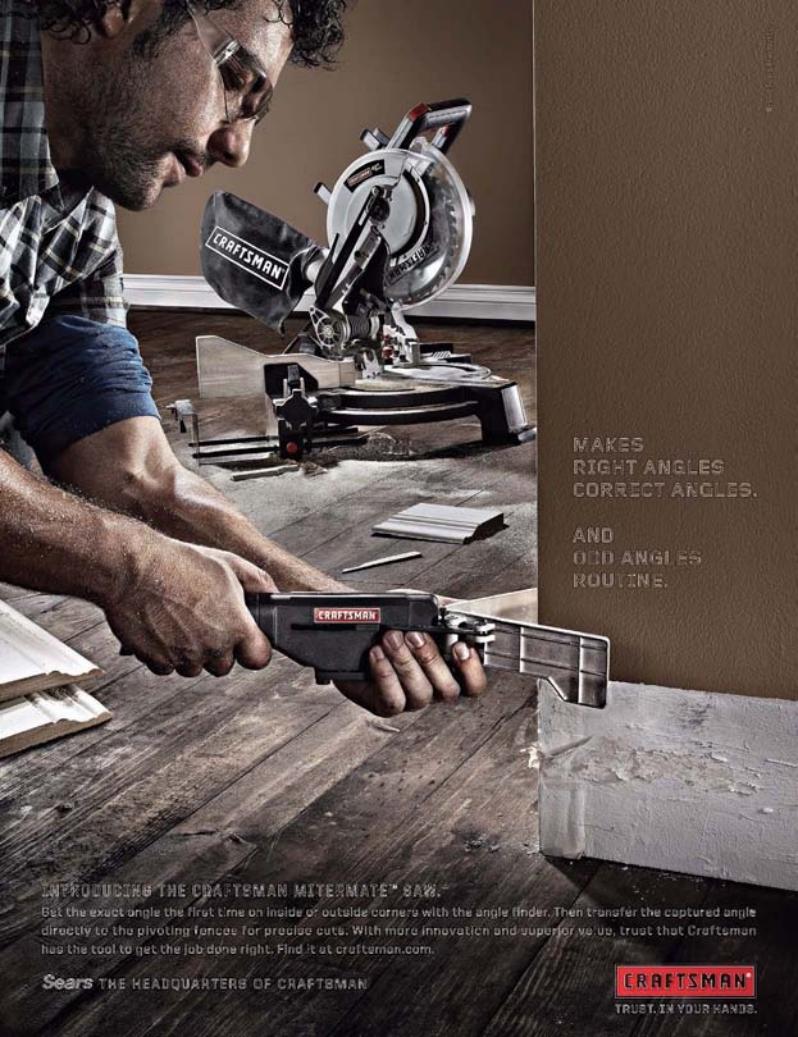
B

This block sands the tenon shoulder but leaves the cheek untouched. Check blocks for square between the edges and faces.

FLATTEN SAW BLADE DADOES

C

To flatten dadoes cut with a saw blade, attach sandpaper to a block of scrap and sand away the ridges.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Chisels: The joint-maker's edge

Uses: Trim smooth walls and square ends on drilled mortises [**Photo D**]; on hand-cut dovetails, slice straight lines for clean joints and shave pins to fit the tails; square stopped rabbets [**Photo E**].
Success secrets: Hone the bevel and flatten the back for an edge sharp enough to shave the hairs on your arm.

A chisel follows grain as it cuts. For paring cuts with the grain, cut from the opposite direction if you begin to feel the chisel plunge down into the wood. Where that's not an option, hold the chisel perpendicular to the grain and tap it to make ⅛" stop cuts. Then remove the wood between the stops.

Use the widest chisel that fits the joint area you're cutting. To trim the walls of a 2"-wide mortise, for example, two cuts with a 1" or 1½" chisel leave cleaner, straighter lines than four or five cuts with a ½"-wide chisel.

Block planes: Perfection comes .002" at a time

Uses: Flush-trim edges on parts joined with a machined dovetail; clean up sawn edges to be glued; chamfer tenon ends and panel edges for easy insertion [**Photo F**]; clean up cross-grain cuts, such as mitered ends on hand-sawn frame pieces; trim ends or edges that stand proud of an adjacent workpiece; make drawer side edges flush with the drawer front.
Success secrets: Check the plane sole for flatness. The best plane works only as well as the sharpness of the blade. (For a video on how to hone a razor-sharp edge using sandpaper, go to woodmagazine.com/sharpeningvid.) Test the plane's cutting depth on scrap until each pass takes a consistent, translucently thin curl [**Photo G**]. Before tackling a workpiece, practice controlling the plane balanced on the edge or end of a ½"-thick practice scrap.

Shoulder planes: Tools that work lying down

Uses: With blades that cut a hair wider than the plane body, these specialized planes straighten tenon shoulders and shave tenon cheeks with ease. Other uses include smoothing dado, rabbet, and groove bottoms, as shown *below.*
Success secrets: You'll often plane cross-grain with this tool, making a razor-sharp blade essential for success. Center the blade on the plane body [**Photo H**]. Then adjust the cutting depth to make shallow passes with no tear-out [**Photo I**]. Because it cuts faster than a sanding block, stop frequently to test-fit parts.

Sources

Shoulder plane. Medium shoulder plane no. 05P41.01 (with a hard A2 steel blade for less sharpening), $175, Lee Valley Tools, 800-871-8158 or leevalley.com.
Block plane. Veritas Apron Plane no. 05P27.02, $85 with an A2 blade, Lee Valley Tools.

SQUARE A DRILLED MORTISE

D

Clamping a guide block—this one with a grooved underside—to your workpiece helps keep the chisel 90° to the edge.

CHAMFER PANEL EDGES

F

Help raised panels slide into stile and rail grooves by making a light chamfer on the edges, working from the edges to the center.

SIDE-TO-SIDE CUTTING CAPACITY

H

With a blade that cuts just wider than the plane body, a shoulder plane takes shavings right up to the walls of a dado or grooves.

CLEAN UP A STOPPED RABBET

E

Straight router bits work fast, but they don't square corners. A sharp chisel completes the rabbet in two quick cuts.

LOOK FOR CONSISTENT CURLS

G

Passes on the edge of a scrap block should produce light curls of even thickness from side to side.

LIGHT PASSES LEAVE CLEAN CUTS

I

Test shoulder-plane-blade depth by making passes against the grain on scrap until it leaves light score marks with no tear-out.

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Bud Vase

Curves as gentle as a flower petal surround a glass vase nestled within this simple project.

Cut a base and vase holder

1 Glue together a vase-holder blank from three pieces of ¾"×2½×7¼" stock (we used walnut), and trim it to size [**Drawing 1**]. Cut the base to size.

2 Center and attach the vase holder to the base using double-faced tape. Drill and drive four screws [**Drawings 1** and **2**]. Copy the **Vase Holder** pattern from the *WOOD Patterns*® insert and spray-mount it to a vase holder side.

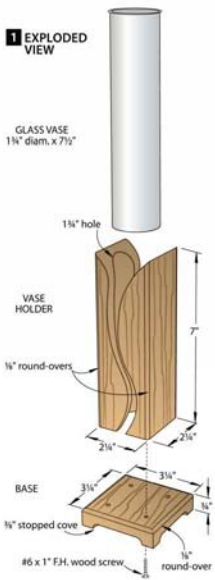
3 Install a ⅛" cove bit in a table-mounted router and set the fence flush with the bearing [**Drawing 2a**]. Clamp stopblocks on the infeed and outfeed fences 2½" from the center of the bit. Then rout stopped coves on the sides and ends of the base [**Photo A**].

4 Remove the vase holder from the base and rout ⅛" round-overs on the top edges of the base.

Drill long holes accurately

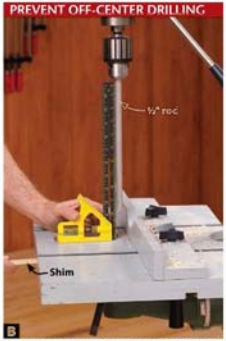
1 Check your drill press to ensure the table aligns 90° to the chuck in all directions [**Photo B**]. Clamp on a tall fence shimmed 90° to the table. (See a free video on how to fine-tune a drill press at woodmagazine.com/drillpress.)

2 Install a Forstner bit the same size as or 1/16" larger than the glass vase diameter. For the 1¾"-diameter glass vase we bought at a hobby store (Libbey #2824), we used a 1¼"-diameter bit. (Drill a test hole in scrap and test-fit the glass vase.) Mark the center of the vase-holder end, and center it below the bit. Clamp a 90° squaring brace to the fence to secure the part.



With the base against the right stopblock, pivot the base into the bit to start the cut. Slide the base until it touches the other stop.

PREVENT OFF-CENTER DRILLING

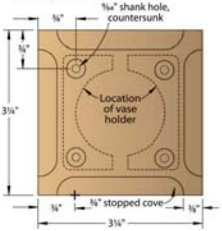


Add shims to make the drill press table 90° to a rod in the chuck. Check the alignment in all directions using a square.

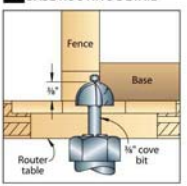
DRILL HALF THE HOLE

In addition to making sure the table rests 90° to the bit, use shims to ensure the tall fence holds the workpiece 90° to the table.

2 BASE (Bottom view)



2a BASE ROUTING DETAIL



3 Drill halfway through the vase holder [**Photo C**]. Depending on your bit and drill press, you may need to stop to raise the table as you drill so that the chuck reaches deeper into the hole. Drill until the bit reaches 3½" deep. Then flip the vase holder over, keeping the same surface against the fence. Clamp it in position and drill until the holes meet.

4 Bandsaw the vase holder and sand to the pattern lines. If the holes drilled in step 3 didn't meet perfectly—ours were off by less than ⅛"—sand them with 100-grit adhesive-backed sandpaper wrapped around a 1" dowel. Take care to maintain the half-round shape on both halves. Then finish-sand all parts to 220 grit.

5 Reconnect the two vase-holder halves to the base. Color the base coves with a black permanent marker to make them less visible. Then apply a clear finish. (We used three coats of aerosol satin lacquer, sanding with 320 grit between coats.)

Written by **Bob Wilson** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

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Blanket Chest

One project, two skill levels, three looks

Overall dimensions: 45¼" wide × 19¾" deep × 20¹¹⁄₁₆" high (Country Fresh version 21¹¹⁄₁₆" high; Casual Contemporary version 21⅜" high)

Have a through-dovetail jig? *See page 38* for tips on using it on panels wider than your jig.

AT A GLANCE

- Lid-stay torsion hinges keep the lid open at any angle.
- Options for joinery, base profile, and wood selection provide custom looks.

Build this chest with your preferences for style and complexity in mind. The Traditional American look in mahogany (*left*) requires dovetailed corner joints, cut by hand or with a router jig. To simplify matters, try the Casual Contemporary version in contrasting woods such as ash and walnut (*below*), with rabbeted corners joined by plugged screws. The Country Fresh option (*below right*), shown in pine, also features rabbeted corners. For that style, we recommend cut nails to hold the joint together.

If you like the dovetailed look but don't have a jig, challenge yourself by hand-cutting those joints. You might be surprised with how nice your results turn out. Start by cutting practice joints in scrap, following the steps on these pages. After a few attempts, you should feel ready to show off your new skills. And here's an extra safety net: On *pages 34* and *35* you'll find two easy tips for fixing any less-than-perfect joints.

WHICH WAY IS UP AND OUT?

A

Label each corner and top edge so you can match pieces properly when laying out the dovetails and assembling the joint.

STAND A LITTLE PROUD

B

Set the gauge to 1/32" more than the panel (A, B) thickness so the pins and tails protrude slightly. Sand them flush after assembly.

SHOP TIP

Use a ratio to set a dovetail angle

You'll often see the angle of a dovetail expressed as a ratio of slope to rise (1:8, for example) instead of in degrees. Why? Because it's easier to set a bevel gauge using a ratio instead of a degree setting. Here's how. For the 1:8 angle used on the blanket chest, mark a 1"-long segment on the edge of a piece of paper. Then, beginning at one end of the line, draw a perpendicular line 8" long. Use a straightedge to connect the ends of the two lines to make a triangle, then place your bevel-gauge handle along the edge of the paper and pivot the blade to align with the long line.

Prep the panels, then cut some tails

1 Glue up material for the front/back (A) and sides (B) [**More Resources**, *page 36*] and cut them to size [**Materials List**, *page 36*]. When cutting dovetails, it's especially important that the panels be flat and of consistent thickness. If you're building the chest with rabbet joints, refer to **Joinery Options** on *page 35*.

2 Clamp the front/back (A) and sides (B) together, label them [**Photo A**], then lay out the dovetail spacing on each end of the front/back [**Drawing 1a**].

3 ***Quick Tip! Gauge your layout.*** Use a marking gauge instead of a pencil to mark baselines. The gauge cuts a clean line that provides a trough for your chisel later and emphasizes the hand-cut look of the joint. Set a marking gauge as shown in **Photo B**; then scribe a baseline across both faces on each end of each panel. Set a bevel gauge to a 1:8 angle as shown in the **Shop Tip** *above*. Then extend the dovetail spacing marks from each end of the front/back (A) down to the baseline. Mark the waste areas between the tails [**Photo C**].

4 Clamp a front/back (A) in a vise or to the front of your bench. Staying on the waste side of the lines, cut to the baseline on both faces [**Photo D**]. A guide block with a 1:8 angle on the end helps start your cut accurately [**Photo D inset**].

5 With a panel facedown on your bench, press a chisel into the baseline in the waste area between the tails to establish an edge. Then make chopping cuts halfway through the panel's

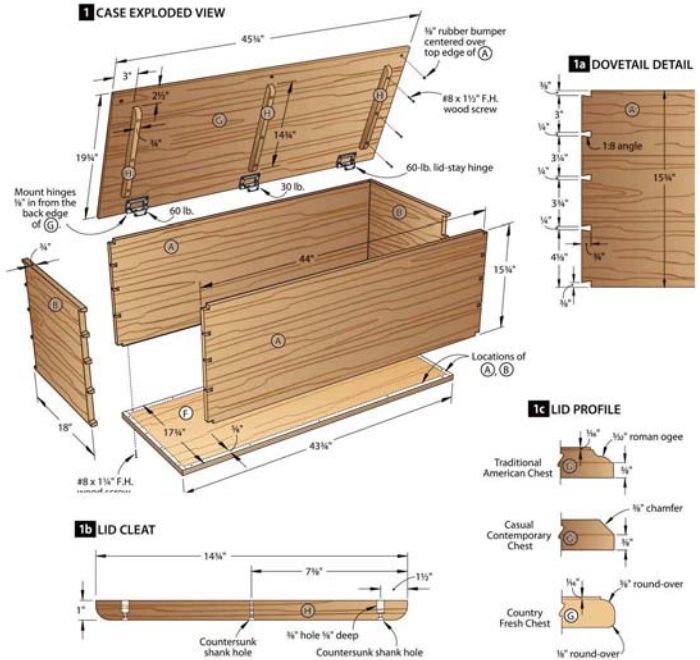
Same chest, different styles

Different woods and base profiles provide a variety of looks for the blanket chest. See Joinery Options on *page 35* for details of the rabbet joints used on these versions.

Extend the dovetail layout marks to the baseline using a bevel gauge set to a 1:8 angle. Mark waste areas between the tails.

Using an angled guide block (inset), start your cut just to the waste side of the line. Saw down to the baseline on both faces.

Press your chisel in at the baseline to create a clean edge. Then, ¼" from the baseline, chop down about halfway through the panel.



Working on one face at a time, chisel in from the end to remove the bulk of the waste from between the tails.

Angle your chisel slightly to undercut the baseline. This allows the pins to seat tightly against the panel for a gap-free joint.

Draw a marking knife along the edges of the tails to lay out the pins on the sides (B). The knife creates a crisp line.

thickness [**Photo E**]. Chip out part of the waste from the end; then flip the panel and repeat this process [**Photo F**]. Work your way back to the baseline, angling the chisel slightly to undercut the baseline [**Photo G**].

Pin it down

1 Clamp the panels together again to create a box, matching the corner labels, and with the front/back (A) against the end grain of the sides (B). Align the inside faces of the sides with the baselines on the inside faces of the front/back. Using a marking or crafts knife, scribe the edges of the dovetails onto the ends of the sides [**Photo H**]. Use a square to transfer the marks from the ends of the sides down the inside and outside faces to the baseline.

2 Secure a side (B) in a vise or to the edge of your bench and cut down to the baseline, staying just outside the lines [**Photo I**]. Remove the bulk of the waste between the pins with a coping saw [**Photo J**], then use a chisel and

Push or pull: See how we saw

Senior Design Editor **Kevin Boyle** made a discovery as he hand-cut the dovetails for the chest: Sometimes the tool you know and love isn't the best one for the job. "The Japanese pull saw (dozuki) I've favored for years wasn't cutting as straight as I wanted. After the blade wandered off course once too often, I switched to a Western-style gent's saw that cuts on the push stroke. The thicker blade helped me cut true. I still use my dozuki for lots of jobs when I need a handsaw, but for dovetails, the gent's saw is now my go-to tool."

Kevin had trouble making the thin blade of a Japanese dozuki saw follow the cutline. So he switched to a gent's saw.

Position the saw next to, but not in, the scribed mark. Cut straight down to the baseline on both faces.

Use a coping saw to remove most of the waste, staying clear of the baseline, and stopping at the cuts at the edges of the pins.

In the waste areas, chisel down 1/16" along the baseline on both faces. Remove the guide board before removing the remaining waste.

L

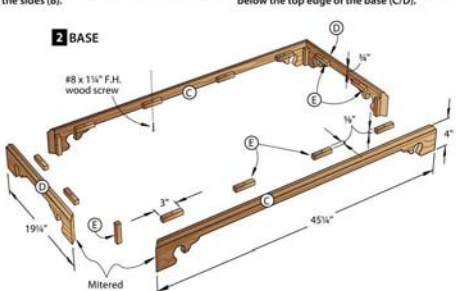
Clamps and cauls apply pressure on the front and back (A), pressing the dovetails tightly to the sides (B).

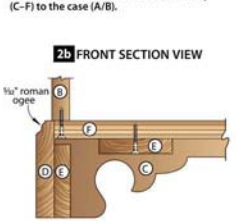
M

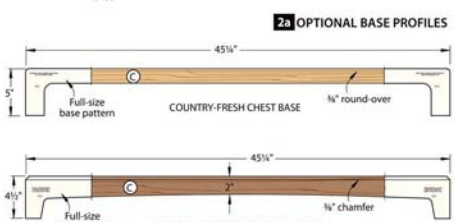
Use a scrap of plywood the same thickness as the bottom (F) to position the glue blocks (E) below the top edge of the base (C/D).

N

Drill countersunk shank holes through the bottom (F), then screw the base assembly (C–F) to the case (A/B).







SHOP TIP

Patch a pin

If you overtrim a pin, glue on a patch, then start trimming again after the glue dries. The end grain of the patch disappears in the assembled joint.

scrapwood guide board to establish a clean baseline [**Photo K**]. ***Quick Tip! Perfect start on the baseline.*** Place the end of your chisel in one end of the scribed baseline, then slide the guide up to it and clamp it in place. Do the same for the other end of the guide. Clamp the center as well to prevent flexing. As with the tails, slightly undercut the baseline when removing the rest of the waste.

3 Try dry-fitting a joint. Make a note of any tight spots that prevent the joint from coming together. Use a chisel to trim these edges of the pins to fit between the tails. Take your time and shave away small amounts, testing the fit often. See the **Shop Tip** *above* if you trim a pin too much. Work your way around the chest, fitting one joint at a time.

4 Once all four joints fit together, apply glue to the edges of the pins and glue up the box [**Photo L**]. ***Quick Tip! Reduce glue-up time.*** Don't

Screw the hinges to the lid (G), then center the lid on the length of the case (A/B) and screw the hinges to the case.

bother gluing the face grain of the pins or tails. These surfaces contact end grain—a weak bond. Use clamping cauls behind the pins to draw the joint tight across the full width of the front/back (A). Check for square by comparing diagonal measurements.

5 After the glue dries, sand the pins and tails flush with the adjacent faces. Avoid rounding over the corners by clamping a scrap to the adjacent panel, flush with the surface of the panel you're sanding. ***Quick Tip! Zap gaps.*** Fix gaps under 1/32" by squeezing in a *small* dab of glue, then sanding the panel with 220-grit sandpaper. The sanding dust sticks to the glue, creating a patch that blends with the joint's end grain.

Give it a base to stand on

1 Cut two 4×48" blanks for the base front/back (C) and two 4×22" blanks for the base sides (D). ***Note:*** *The bases for the Casual Contemporary and Country Fresh versions are different widths* [**Materials Lists**]. Tilt your tablesaw blade to 45° and miter-cut the base pieces to 1¼" longer than the outside dimensions of the case [**Drawing 2**].

2 Make a copy of the **Traditional American Blanket Chest Base Pattern** (or the pattern for the chest you're building) from the *WOOD Patterns®* insert and spray-adhere it to a piece of ¼" plywood or hardboard. Cut the pattern to shape and sand the edges smooth. Use this template to lay out the profile on the ends of the base front/back (C) and sides (D). Cut each profile to rough shape on the bandsaw, then sand and file up to the lines.

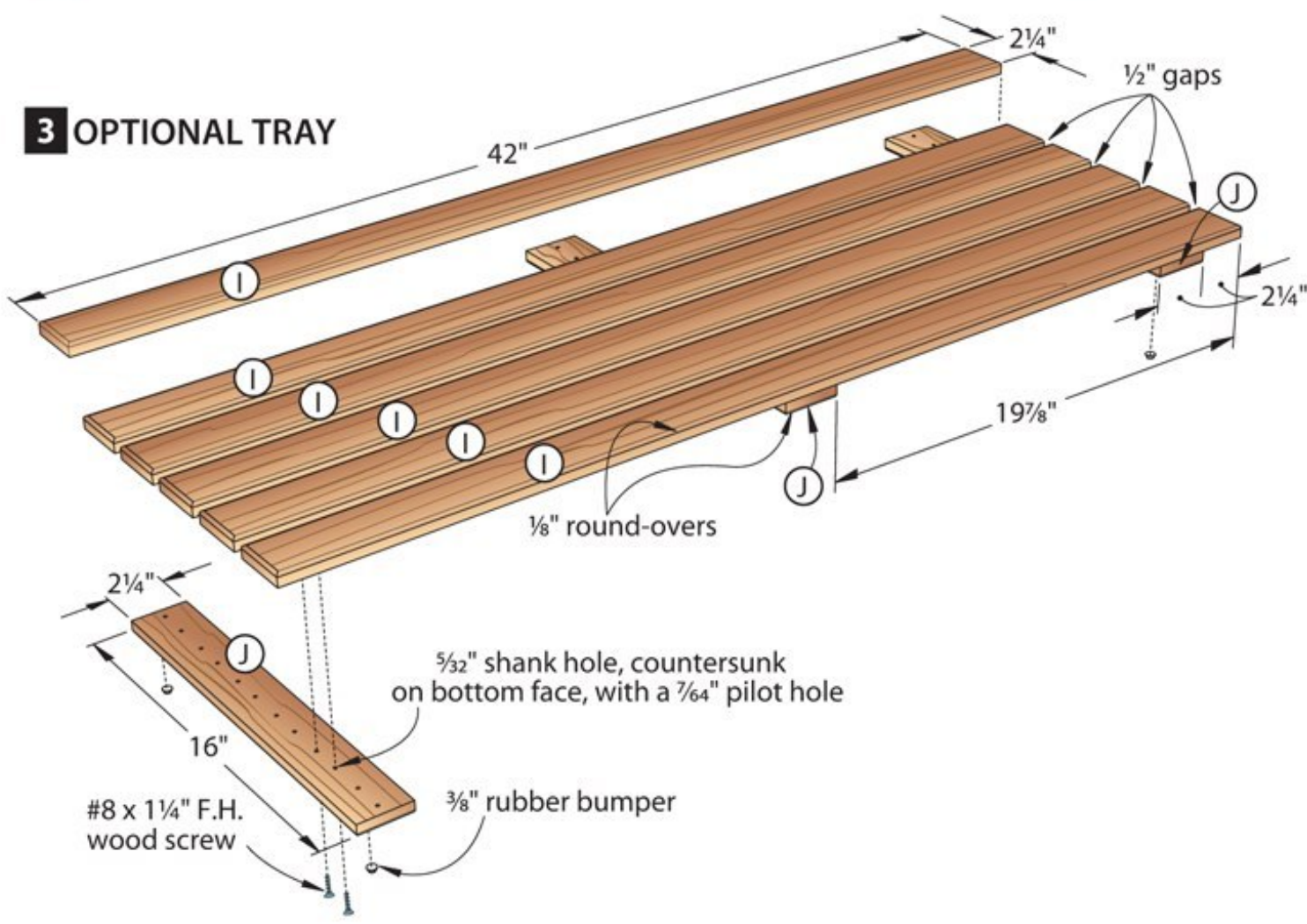
3 Rout a profile around the top edges of the base front/back (C) and sides (D) [**Drawings 2a, 2b**]. Cut 16 glue blocks (E) to size and set 12 of them aside for the moment. Glue up the base with a glue block vertical in each corner, pulling the corners tight with band clamps. Then glue and clamp the remaining glue blocks in place [**Photo M, Drawing 2**].

4 Cut the bottom (F) to fit inside the base (C/D/E). Drill one countersunk pilot hole in each horizontal glue block (E) [**Drawing 2b**] and screw the base to the bottom.

5 Flip the case (A/B) upside down, center the base (C–F) on it and screw the base to the case [**Photo N**].

Build a drop-proof lid

1 Edge-glue stock for the lid (G) and cut it to size. Sand the lid to 150 grit, then rout a profile around it [**Drawing 1c**].

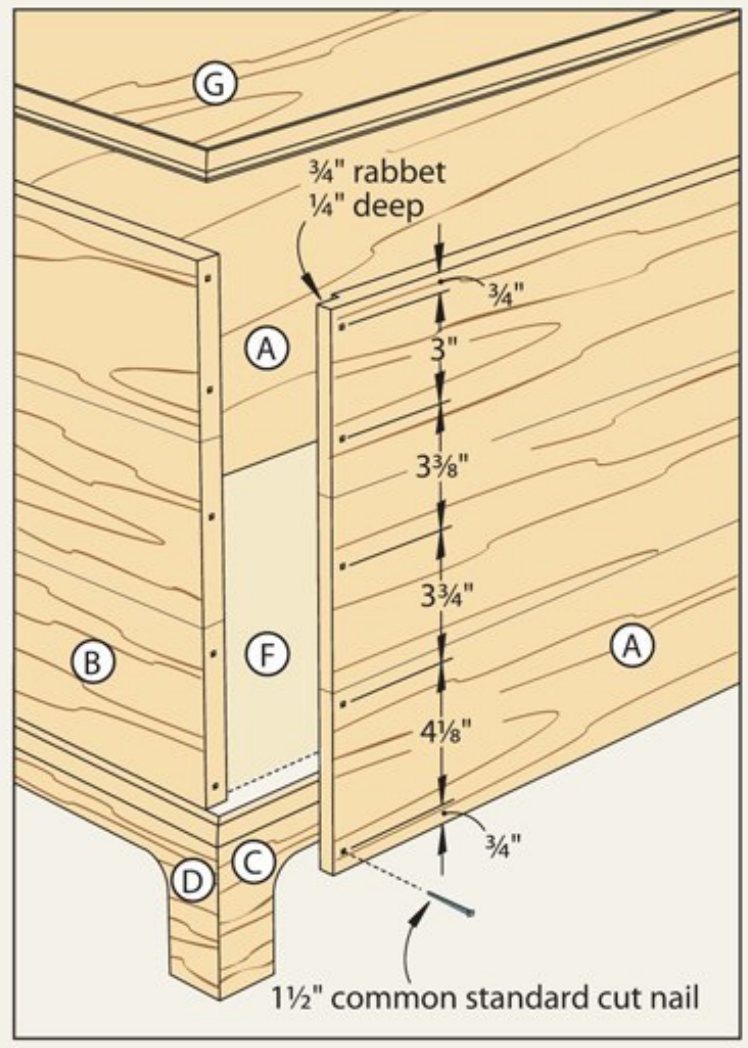


Joinery options

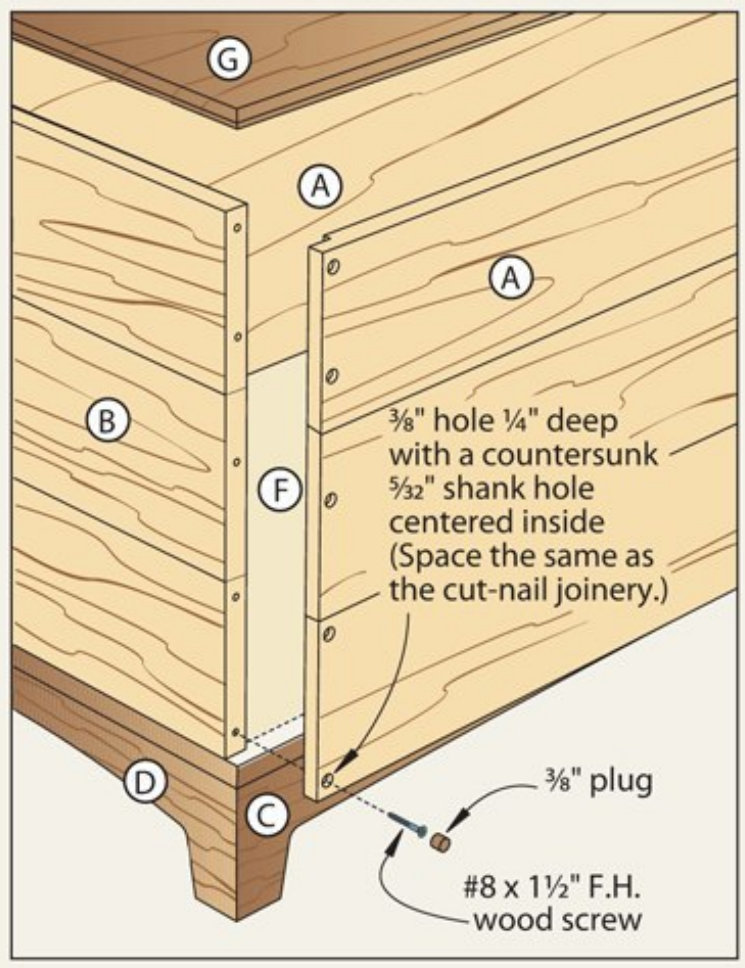
Instead of dovetails, these versions of the chest use rabbet joints, reinforced with cut nails or screws.

On the ends of the front/back (A), cut rabbets the same width as the thickness of the sides (B). Lay out the fastener locations, then clamp the front, back, and sides together. For the cut-nail chest, drive the nails. For the screw-and-plug chest, drill counterbores with shank and pilot holes and drive the screws. Glue walnut plugs into the counterbores and sand them flush.

CUT-NAIL JOINERY



SCREW-AND-PLUG JOINERY



2 Cut three lid cleats (H) to size, drill countersunk pilot holes and counterbores [**Drawing 1b**] and screw the cleats to the underside of the lid [**Drawing 1**]. Do not use glue.

3 Screw the lid-stay torsion hinges to the lid (G) and case (A/B) [**Drawing 1, Photo O**]. We used two 60-lb hinges with a 30-lb hinge in the middle. ***Note:*** *The number of hinges required depends on the size and weight of your lid. Use the torsion calculator provided on Rockler's web site (rockler.com) if needed.* Adhere three rubber bumpers to the front underside of the lid so they rest on the front (A) when the lid is closed.

4 Remove the hinges, finish-sand the chest to 220 grit, then apply a finish. We used boiled linseed oil inside and out, then applied two coats of water-based polyurethane to the outside. If you won't have a cedar tray in the chest, you can apply the polyurethane inside as well.

Add a cedar tray

For a chest that stores clothes or blankets, consider making this tray to sit on the bottom. Made from aromatic cedar, it helps ward off moths naturally—and it smells great.

1 Cut the slats (I) and cleats (J) to size. Rout round-overs where shown in **Drawing 3**.

2 Clamp the slats (I) and cleats (J) together with ½" between the slats. Drill countersunk pilot holes through the cleats and into the slats; then screw the tray together [**Drawing 3**]. Add rubber bumpers to the bottom of the cleats to lift the tray off the bottom of the case. Do not apply a finish to the tray so the aroma of the cedar can fill the chest.

Written by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

MORE RESOURCES

FREE VIDEO
■ "Clamp and Sand Panels Flat" at woodmagazine.com/panels

RELATED ARTICLE
■ "Build Flawlessly Flat Panels" Issue 163 (June/July 2005) $

($–Download this article from woodmagazine.com/plans for a small fee. Type "flawlessly" in the Search box.)

Materials List Traditional American Chest

Case		FINISHED SIZE T	W	L	Matl.	Qty.
A	front/back	¾"	15¾"	44"	EM	2
B	sides	¾"	15¾"	18"	EM	2
C*	base front/back	¾"	4"	45¼"	M	2
D*	base sides	¾"	4"	19¼"	M	2
E	glue blocks	½"	¾"	3"	M	16
F	bottom	¼"	17¾"	43¾"	BP	1
G	lid	¾"	19¼"	45¼"	EM	1
H	lid cleats	¾"	1"	14¾"	M	3
Optional tray						
I	slats	¾"	2¼"	42"	AC	6
J	cleats	¾"	2¼"	16"	AC	3

*Parts initially cut oversize. See the instructions.

Materials key: EM–edge-glued mahogany; M–mahogany; BP–birch plywood; AC–aromatic cedar.
Supplies: Spray adhesive, #8x1¼" flathead wood screws (30; 66 if building optional tray), #8x1½" flathead wood screws (9), ⅜" rubber bumpers (3; 7 if building optional tray).
For cut-nail joinery: Add 1½" common standard cut nails (20).
For screw-and-plug joinery: Add (20) #8x1½" flathead wood screws, ⅜" walnut plugs (20).
Bits: ½" roman ogee bit for Traditional American chest, ¼" round-over bit for Country Fresh chest, 45° chamfer bit for Casual Contemporary chest, ⅛" round-over bit for optional tray.

Sources

Torsion hinges: 60-lb. lid-stay hinges (2) no. 21771 [pack of 2], $37.99; 30-lb. lid-stay hinge (1) no. 28814 [pack of 1], $19.99, Rockler, 800-279-4441, rockler.com.
Cut nails: 1½" common standard (20) no. CC4 [1 lb.], $7.25, Tremont Nail, 800-835-0121, tremontnail.com.
Walnut plugs: ⅜" flat top (20) item 20875 [pack of 50], $3.99, Rockler.

Materials List Casual Contemporary Chest

Case		FINISHED SIZE T	W	L	Matl.	Qty.
A	front/back	¾"	15¼"	44"	EA	2
B	sides	¾"	15¼"	**17"**	EA	2
C*	base front/back	¾"	**4½"**	45¼"	W	2
D*	base sides	¾"	**4½"**	19¼"	W	2
E	glue blocks	½"	¾"	3"	A	16
F	bottom	¼"	17¾"	43¾"	BP	1
G	lid	¾"	19¼"	45¼"	EW	1
H	lid cleats	¾"	1"	14¾"	W	3

*Parts initially cut oversize. See the instructions. **Bold** dimensions are different from Traditional American chest.

Materials key: EA–edge-glued ash; A–ash; W–walnut; BP–birch plywood; EW–edge-glued walnut.

Materials List Country Fresh Chest

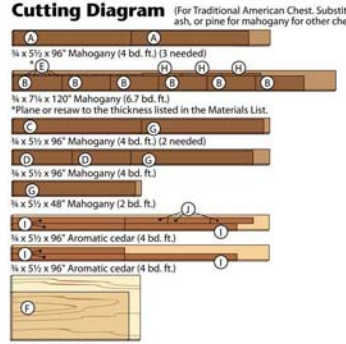
Case		FINISHED SIZE T	W	L	Matl.	Qty.
A	front/back	¾"	15¼"	44"	EP	2
B	sides	¾"	15¼"	**17"**	EP	2
C*	base front/back	¾"	**5"**	45¼"	P	2
D*	base sides	¾"	**5"**	19¼"	P	2
E	glue blocks	½"	¾"	3"	P	16
F	bottom	¼"	17¾"	43¾"	BP	1
G	lid	¾"	19¼"	45¼"	EP	1
H	lid cleats	¾"	1"	14¾"	P	3

*Parts initially cut oversize. See the instructions. **Bold** dimensions are different from Traditional American chest.

Materials key: EP–edge-glued pine; P–pine; BP–birch plywood.

Cutting Diagram

(For Traditional American Chest. Substitute walnut, ash, or pine for mahogany for other chest styles.)



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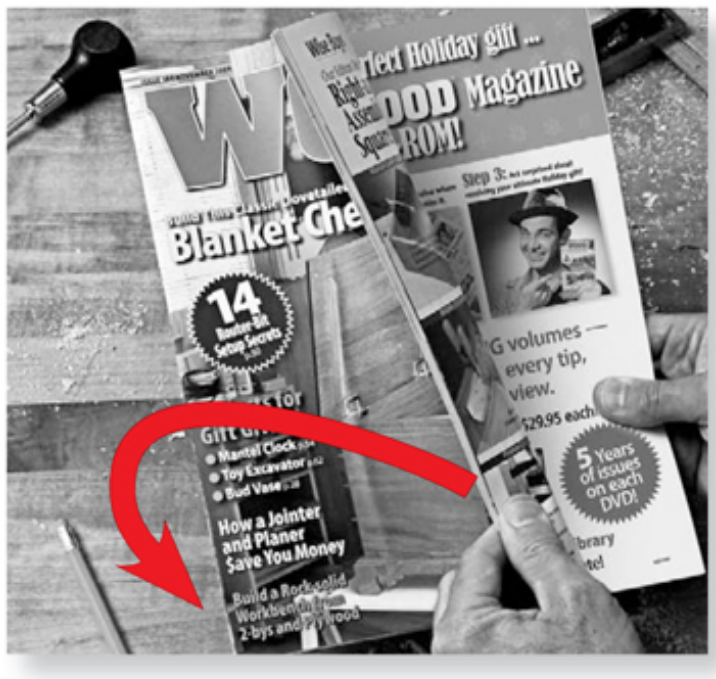

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WD1209

Dovetailing Wide Panels

Now your through-dovetail jig has no limits.

So your through-dovetail jig only accepts boards up to 12" wide. That doesn't mean you can't use it to cut joints in panels as wide as you care to make. Simply free the template from the restrictions of the jig base and take it to the panels. Here's how.

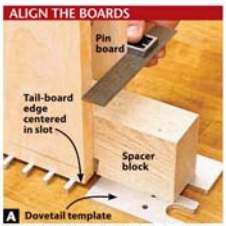
Setting up

You'll need two routers: one for the dovetail bit and one for the straight bit that cuts the pins. This eliminates switching bits in and out of one router and resetting bit heights. Also prepare two test boards the same width and thickness as your project parts. You'll cut dovetails on one (the tail board) and pins on the other (the pin board).

Remove the through-dovetail template from the jig and remove any stops or brackets. Make two spacer blocks about as long as the template, 3" wide, and thick enough to extend ½" into the slots on both edges of the template. Screw one block to the underside of the template and set the other aside for now.

Mark a baseline on the inside face of the tail board by standing the pin board on end, flush with the end and edges of the tail board. Scribe the pin board's thickness on the tail board.

Clamp the test boards to opposite sides of the spacer block, with their inside faces out, and tight to the underside of the template (**Photo A**). Turn the assembly template side up, place the other spacer between the panels, then clamp this assembly in a vise or to the front of your bench with the tail board facing you (**Photo B**).



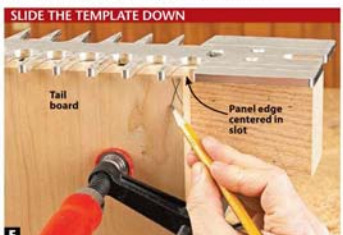
Center the tail board's edge in a slot. Use a square to align the pin-board and tail-board edges so they end up flush after assembly.

Clamp the panels and jig to a riser block clamped to your bench. Sandpaper on the riser-block face keeps things from slipping.

Mark the waste between the tails. Then set each bit so the pins and tails stand proud of the panels. Sand them flush after assembly.

Push the router only into slots above marks. Rout slowly enough to reduce chip-out but not so slowly that the wood burns.

Mark pins for removal. Those across from a tail get an "X." Leave any pin directly across from a space between tails.



After repositioning the template and clamping the panels to the spacer, lay out the remaining dovetail cuts.

Now mark with an "X" the material you intend to rout away. For variably spaced dovetails, such as those on the blanket chest on *page 30*, don't rout in each dovetail slot. For the blanket chest's 15¾"-wide panels, for example, we marked below the first two slots, then skipped one and marked below the fourth slot [**Photo C**], skipped two more and marked below the seventh, then skipped three to mark below the eleventh slot.

Finally, set the bit in each router to cut 1/32" below the baseline on the tail board [**Photo C**].

Cutting the joint

Rout the tails first [**Photo D**]. Then switch routers and cut into every slot on the pin side of the template. Especially when routing the pins, keep the router flat on the template. Tipping creates an uneven edge between the pins.

Loosen the upper clamps and slide the template down to center the newly cut pins in the slots [**Photo E**]. (You may need to tap the spacer block with a mallet to slide the template.) Mark the pins across from a tail. Clamp the panels and spacer again, making sure the boards are snug against the template and that their edges are flush; then rout away the marked pins. Depending on the jig, this may leave a small sliver you can snap off, or you can slide the template again for further cleanup with the router.

With the pins cleaned up, loosen the upper clamps again and slide the template so the unrouted edge of the tail board splits a slot in the template [**Photo F**]. Make marks to complete your tail layout. (For our panels, that was just one slot.) Then repeat the routing process to complete the joint.

Fine-tuning the fit

Assemble the joint if you can. To dial in a perfect fit, move the template forward or backward on the spacer. For a too-tight joint, shift the template toward the tail side of the spacer. For a too-loose joint, move the template toward the pin side. Cut the ends off your test boards and try again until you get a snug fit.

After the test joint fits properly, rout joints on your project parts. Remember that you rout opposite corner joints on each end of the jig: With the tail side of the jig facing you, the front left and back right joints start on the left end of the jig. The front right and back left start on the right end. (This puts the dovetails on the front and back panels.) Before routing your project pieces, clamp them together and label each piece and corner so you keep them straight.

Written by **Craig Ruegsegger** with **Kevin Boyle**

MORE RESOURCES

FREE VIDEOS

- See this technique in action at woodmagazine.com/dovetailpanels
- "Dovetail Showdown: Man vs. Machine" Find out if it's faster cutting dovetails by hand or with a router and jig at woodmagazine.com/dtvideo

RELATED ARTICLE

- "Through-Dovetail Jigs Under $350," issue 175 (March 2007) $

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FREE* Jointer and Planer!

*With the money you save surfacing rough-sawn stock.

Have you been itching to pull the trigger on that new jointer and planer, but hesitating because you can't afford them? Truth is, you can't afford *not* to own them. Here's how to make a jointer and planer pay for themselves.

No matter the wood, the cost per board foot goes up for every milling step performed by your lumber supplier. Straight-line rip one edge (SLR1E)? Add a fee. Surface both faces (S2S)? Crank up that price. Surface four sides (S4S)? You had better be rolling in dough.

By the time fully milled wood slides into a home-center lumber bin (after being individually tagged, shrink-wrapped, and palletized), the cost has skyrocketed. Worse, if the ¾"-thick board warps or cups, even slightly, you can't mill out the defect without going below ¾". That's why it pays to intercept wood as early as possible in the milling process, from either a local sawmill or lumberyard, and mill it yourself.

Do I need both a jointer and planer?

In a word: Yes. Though they remove wood in similar ways, each tool provides only half of the milling equation. First you flatten one face of the board on the jointer. Next, with the flat face pressed against the jointer fence, square an adjacent edge. And finally, make the opposite face parallel to the first using a planer. A few passes will reduce the board to a uniform thickness.

Sawmills sell either rough-sawn or skip-planed boards. Skip-planed boards give you a clearer picture of a board's grain and color.

A case study: Banking "bread" while building blanket chests

Species	Home-center cost	Lumberyard cost (rough-sawn)	Savings per chest	Number of projects before break-even*
Red oak	$197.52	$96.39	$101.13	
Maple	$188.40	$130.05	$58.35	
Pine	$127.28	$84.15	$43.13	

*** Cost for solid-wood parts to build the Blanket Chest project on *page 30*. We placed the savings against a Delta 6" benchtop jointer ($240 at lowes.com) and a Ryobi 13" benchtop planer ($200) at a total cost of $440 at the time of writing.**

But can I afford them?

Again, yes. Let's walk through the math. We'll use the Blanket Chest on *page 30*. as an example, because it is a medium-size project constructed primarily of solid wood.

For an apples-to-apples comparison, we priced only the primary, solid-wood parts, not the plywood, hardware, optional cedar tray, and any hidden parts that can be made out of scrap woods or offcuts.

Because home centers typically sell wood in common dimensioned sizes, we came up with a by-the-board shopping list to pit against our by-the-board-foot lumberyard order, *at right, above*. We also added a generous 25 percent to the lumberyard order to account for waste in the milling process.

Then we priced several species of lumber at a local home center and a local lumberyard. The "Case Study" chart, *top*, shows the cost differences in red oak, maple, and pine. Remarkably, the lumberyard oak cost less than half as much as home-center oak. Build only about four projects this size and you'll save enough lumber money to buy an entry-level jointer *and* planer.

A planer lets you thickness lumber to the needs of the project rather than conforming the project to over- or undersize lumber.

Blanket chest shopping lists...

Home Center:	Lumberyard:
8pc 1×6×72"	30 board feet
4pc 1×3×48"	rough-sawn
4pc 1×6×48"	

Instead of pre-dimensioned lumber, you'll buy by the board foot at the lumberyard. Board feet is the thickness×length×width in inches divided by 144.

Besides saving you money, shopping at a lumberyard opens up new species possibilities. For example, you could upgrade to rough-sawn mahogany from a home center's premium-priced red oak and still save $29.22 per chest. The ash/walnut combination described in the plans costs $107.62 less per chest than home-center oak.

And if you feel like adding in the optional cedar tray, don't count on finding presurfaced aromatic eastern red cedar in a home center. For presurfaced material, you're likely limited to mail-order sources which will add $27 per blanket chest over rough-sawn aromatic cedar from a lumberyard.

Enough math. Time to shop!

For our cost comparison, we priced the Delta 6" benchtop jointer (model JT160, $240, 800-223-7278, deltaportercable.com) and the Ryobi 13" benchtop planer (model AP1301, $200, 800-525-2579, ryobitools.com). These entry models will serve you well. But spending a little more here can pay big dividends.

For example, stationary jointers' longer, heavier infeed/outfeed tables improve accuracy and control on long workpieces. Both the infeed and outfeed tables adjust for fine-tuning the cut. And their more-powerful induction motors last longer than the noisy universal motors on their benchtop counterparts. Pricier, sure. But if you're going to be milling the amount of lumber that demands such a machine, you'll find it pays for itself in due time as well.

Now leave this article lying someplace where your home's budget maker will see it. (Sorry, you're on your own for that motorcycle you've had your eye on.)

Written by **Lucas Peters** with **Jeff Mertz**

MORE RESOURCES

FREE VIDEO

- "Prepping Stock with a Jointer and Planer" at woodmagazine.com/stockprepvid

FREE PLANS

- Jointer knife-adjustment jig, jointer pushstick, auxiliary planer bed, edge-planing jigs, and more at woodmagazine.com/jointing

RELATED ARTICLES

- "No-Fail Routines for Jointing and Planing," issue 189 (March 2009) $
- "Troubleshooting Jointers" issue 168 (Feb./Mar. 2006) $
- "Get the Most from Your Planer" issue 173 (Nov. 2006) $

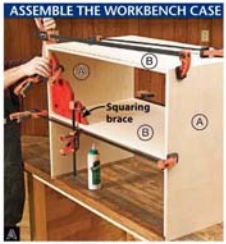
Takes-a-Beating, Budget-Friendly Workbench

This weekend, build a workbench that's big enough to hold furniture projects, yet portable enough to tuck away.

PROJECT HIGHLIGHTS

- Overall dimensions: 57" wide × 28" deep × 36" high.
- Materials needed: Pine dimensional lumber and birch plywood, both available at home centers.
- Pocket-hole screws make the face frames easy to assemble.
- Benchtop overhangs let you install a vise later.

ASSEMBLE THE WORKBENCH CASE



Squaring braces clamped to the case (shown upside down) during glue-up keep the sides (A) perpendicular to the shelf and bottom (B).

Wheel this bench into action fast. A pair of legs adjust to suit uneven floors, while dual-locking casters keep the other end from budging. And you can do it all for around $125 in materials and hardware.

Make the case and frame

1 Cut the sides (A), shelf and bottom (B), and top cleats (C) to size [**Materials List**, *page 44*]. Drill shank holes where shown on the bottom. (For the #8 screws in this project, drill 9/32" shank holes.)

2 With a dado blade as wide as the plywood thickness, cut a dado on the inside face of each side (A) [**Drawing 1**]. Add an auxiliary fence to your rip fence and cut the rabbets in the sides.

3 Sand the sides (A) and the shelf and bottom (B) to 180 grit. Glue and clamp them [**Photo A**].

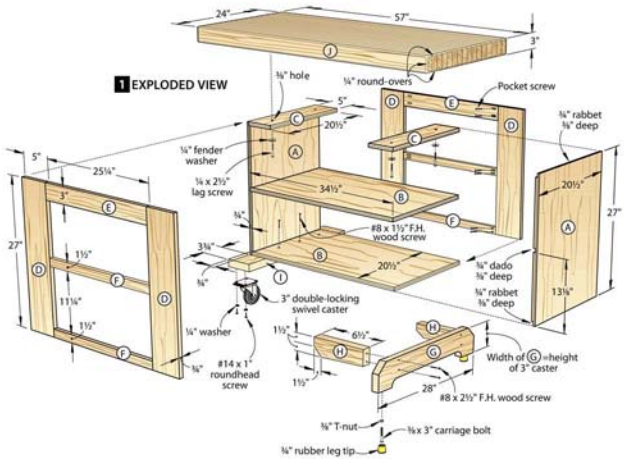
4 Drill 3/8" mounting holes in the top cleats (C) where shown [**Drawing 1**]. Then glue and clamp them to the sides (A) using squaring braces.

5 Cut to size the face-frame stiles (D), top rails (E), and bottom and middle rails (F). Drill pocket holes on the ends of the top and bottom rails. Then glue and screw the frames on a flat surface [**Photo B**]. After the glue dries, glue and screw the middle rails in place.

6 Sand the frames to 180 grit. Then glue and clamp them to the case with the stiles flush with the sides (A) and the rails flush with the bottom (B) and top cleats (C).

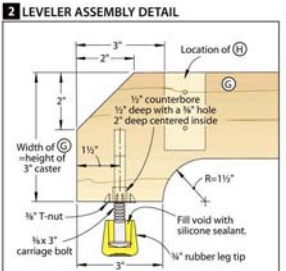
Now add the feet

1 Measure the caster height, then rip the foot (G) to that width and cut it



Clamp the face-frame rails (E, F) while driving the pocket screws. A clamp on top of the joint holds the pieces flush.

2 LEVELER ASSEMBLY DETAIL



to length [**Materials List**]. Cut the foot braces (H) and caster support (I) to size.

2 Use a jigsaw or bandsaw to cut the foot (G) to shape; sand smooth [**Drawing 2**]. Drill ½" counterbores and ⅜" holes where shown. Seat the T-nuts in the ½" counterbores.

3 Glue and screw the foot braces (H) to the foot (G). Glue and clamp the foot assembly (G/H) to the case, leaving a ¾" reveal. Glue and screw the caster support (I) to the case where shown.

Top it off with 2×4s

1 Cut to length 16 straight 2×4s for the top (J). Plane both faces of each for smooth gluing surfaces. Then joint or rip one edge of each to remove the round-overs and rip them to width to remove the opposite round-overs.

Quick Tip! **Move faster than the wood.** Construction lumber typically contains more moisture than kiln-dried hardwoods, and machining can release new stresses in the wood as freshly exposed surfaces dry out. Allow the wood at least two days to acclimate to your shop, but glue the top together immediately after planing and ripping the wood to limit movement problems.

2 Make six ¼×2×12" hardwood cauls to control stock during glue-up. Place wax paper between the cauls and top (J). Then glue and clamp the top in two groups of eight boards [**Photos C** and **D**], and remove squeeze-out before it dries.

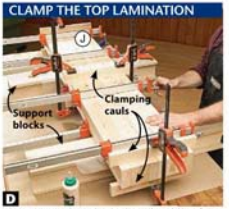
3 After the glue dries, plane both faces of both halves to the same thickness. Depending on the flaws in the lumber, this can be from 3" to 3¼" thick. Some surface flaws may need to be filled with epoxy, as shown in the **Shop Tip** *below*.

4 Glue and clamp the top (J) halves together. Sand the halves flush on the top and ends to 180 grit. Then rout ¼" round-overs along the edges.

PAINT ROLLER DISTRIBUTES GLUE

C A foam mini roller quickly spreads glue on the eight top (J) pieces. Waxed paper keeps squeeze-out off the riser blocks.

CLAMP THE TOP LAMINATION



D Clamping cauls at the ends and middle of the glue-up hold the top pieces (J) flush while you attach clamps above and below.

You're on a roll

1 Finish-sand any remaining spots to 180 grit and apply a finish. (We used two coats of oil-based wipe-on varnish.) Drill and screw the casters to the caster support (I) about ¼" in from each end.

2 Make two levelers by placing the heads of ⅜×3" carriage bolts into ¾" rubber leg tips. Fill the area around the bolt heads with silicone caulk to hold the tips on the bolt heads. After the caulk cures, insert the levelers halfway into the T-nuts in the foot (G).

3 Center the top (J) on the case. Drill and drive lag screws and washers through the top cleats (C) mounting holes into the top. Now wheel your new bench to the center of your shop and put it to work.

Written by **Bob Wilson** with **Jeff Mertz**
Project design: **Dale Faulstich**, Sequim, Wash.
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

SHOP TIP

Fill flaws with tough epoxy

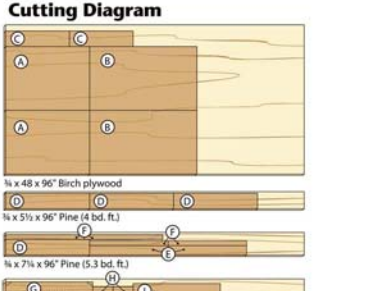
Patching voids in the 2×4 top calls for a tough filler. First make a disposable spreader by sanding a bevel on a hardboard scrap. Then mix 5-minute epoxy and force it into the voids until they're filled. After the epoxy hardens overnight, sand it flush with the top.

MORE RESOURCES

FREE DOWNLOADS

- Plans for a squaring brace at woodmagazine.com/brace
- More workbench plans at woodmagazine.com/workbenchplans
- Flatten an uneven benchtop at woodmagazine.com/flatten

Cutting Diagram

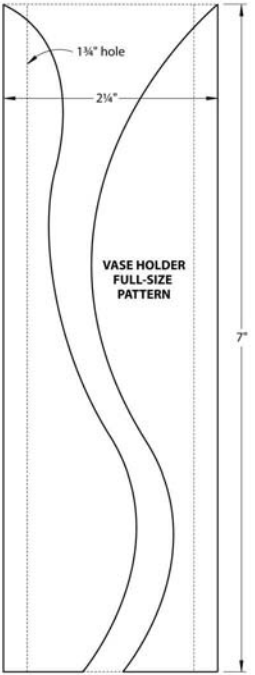


Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A	sides	¾"	20½"	27"	BP	2
B	shelf/bottom	¾"	20½"	34½"	BP	2
C	top cleats	¾"	5"	20½"	BP	2
D	face-frame stiles	¾"	5"	27"	P	4
E	face-frame top rails	¾"	3"	25¾"	P	2
F	face-frame bottom/ middle rails	¾"	1½"	25¾"	P	4
G	foot	1½"	4½"*	28"	P	1
H	foot braces	1½"	3"	6½"	P	2
I	caster support	1½"	4"	28"	P	1
J	top	3"	24"	57"	LP	1

* Cut to match caster height. See the instructions.

Materials key: BP–birch plywood, P–pine, LP–laminated pine.
Supplies: #8×1½" flathead wood screws, #8×2½" flathead wood screws, ⅜×3" carriage bolts (2), ¼×2½" lag screws (4), #14×1" roundhead screws (8), ¼" T-nuts (2), ¼" washers (8), ¼" fender washers (4), 3" double-locking swivel casters (2), ¾" rubber leg tips (2), silicone caulk, 5-minute (quick-set) epoxy.
Blade and bits: dado set, ½" Forstner bit, ¼" round-over bit, pocket-hole jig and bit set.



Better Homes and Gardens®

WOOD® PATTERNS®

November 2009 *Issue 194*

Dear Reader: As a service to you, we've included full-size patterns on this insert for irregular-shaped and intricate project parts. You can machine all other project parts using the Materials List and the drawings accompanying the project you're building.

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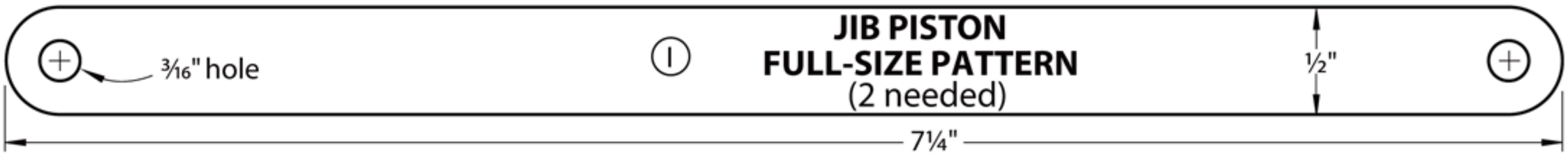
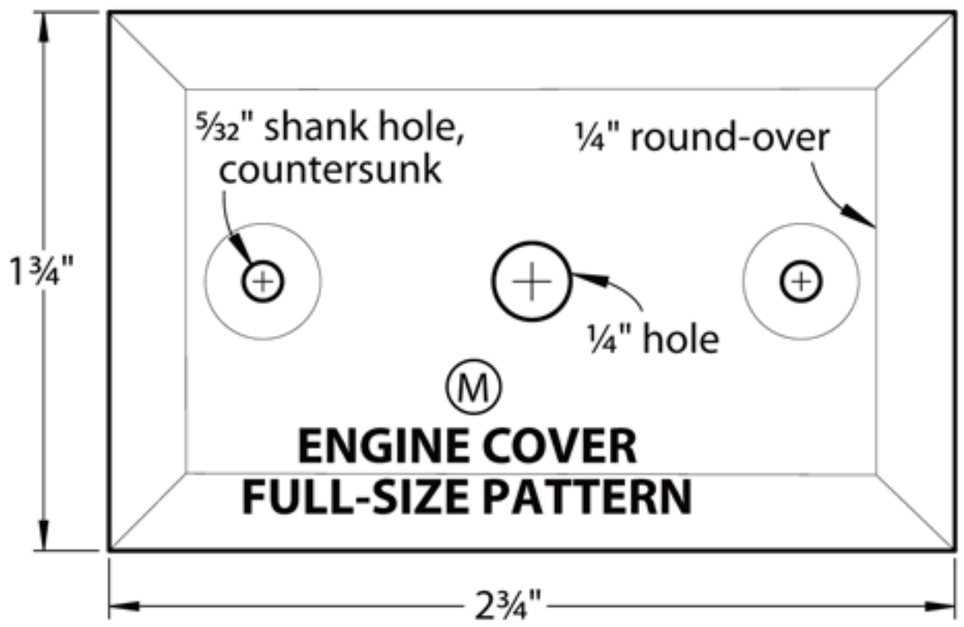
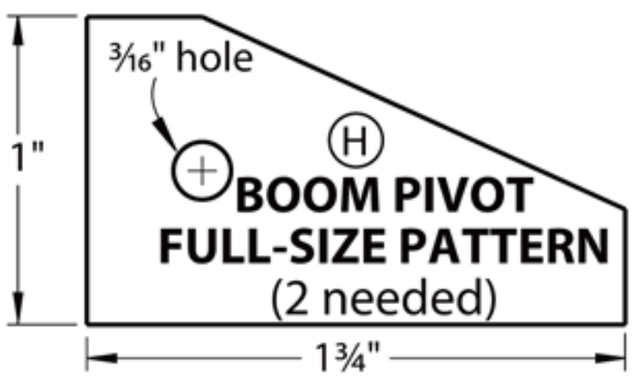
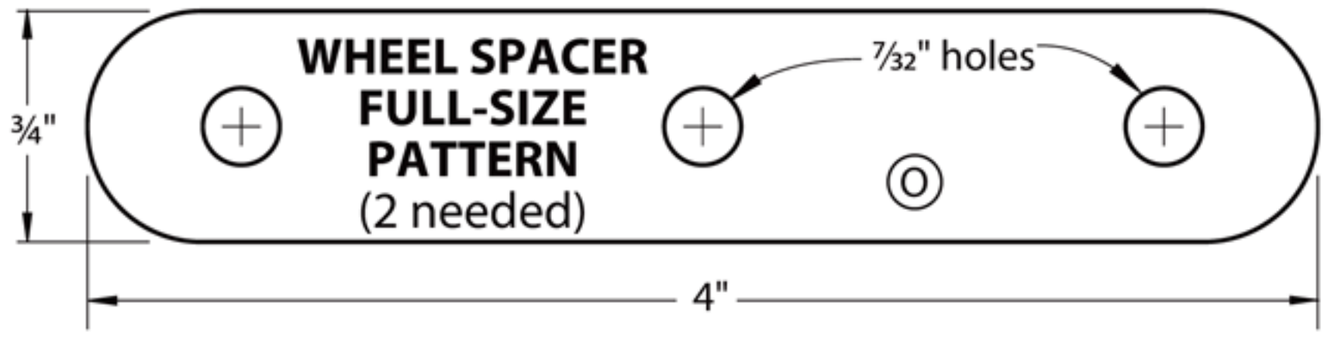
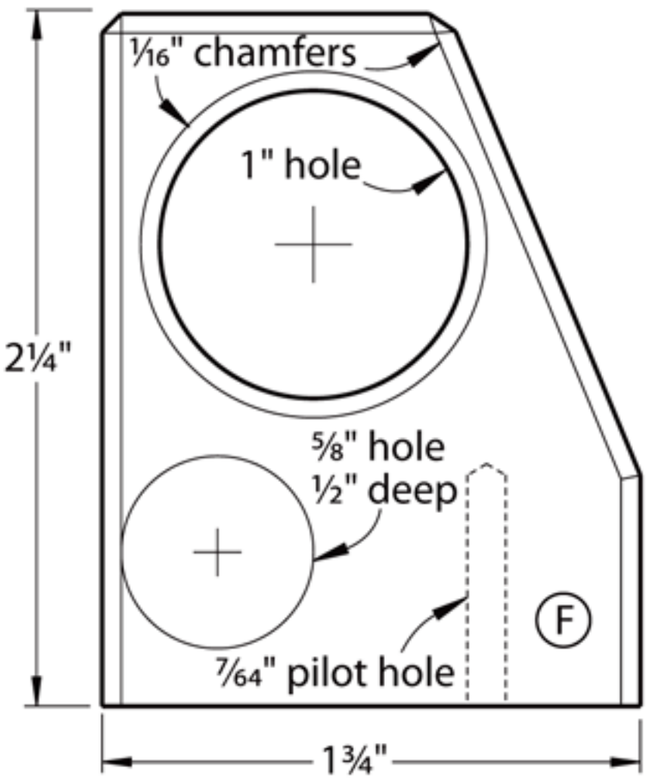
Bud Vase
Page 28



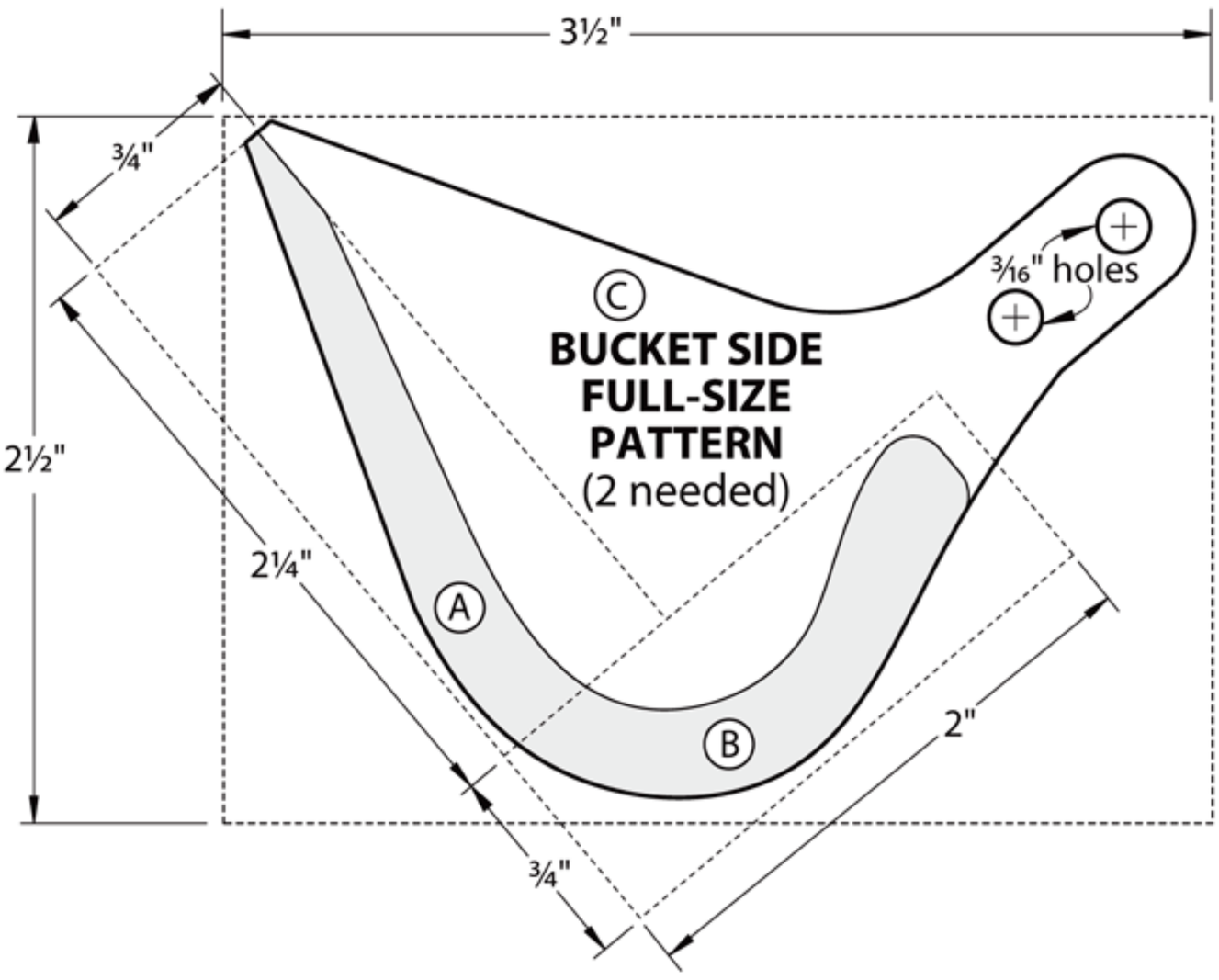


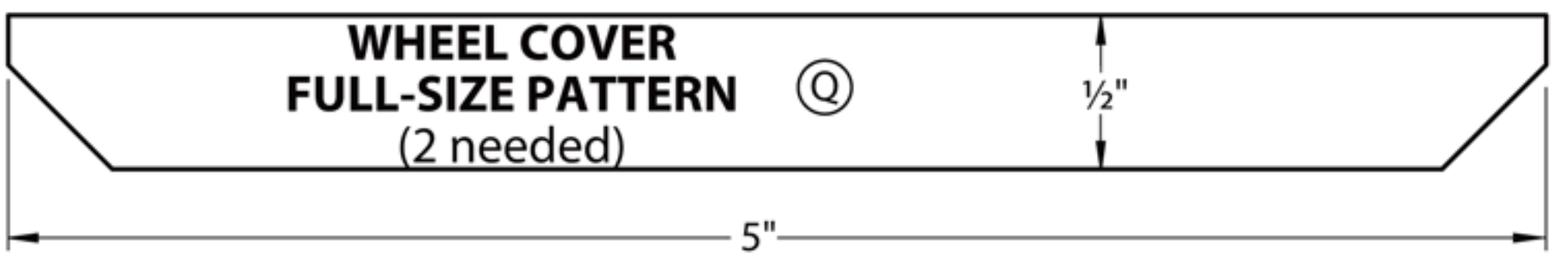


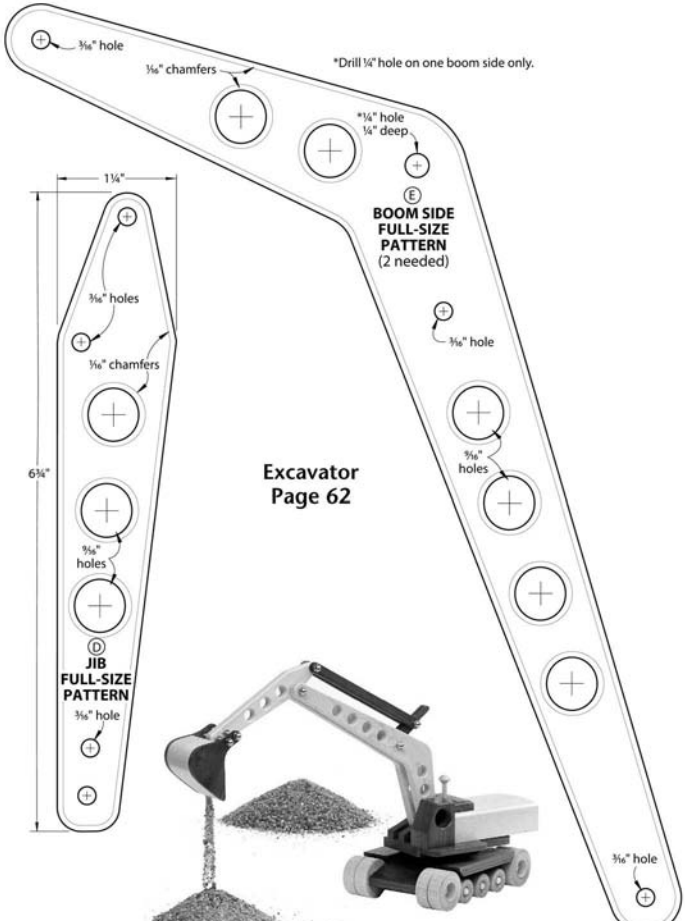




CAB
FULL-SIZE PATTERN






3/16" hole
1/16" chamfers
*Drill 1/4" hole on one boom side only.
*1/4" hole
1/4" deep
E
BOOM SIDE
FULL-SIZE
PATTERN
(2 needed)
1 1/4"
3/16" holes
1/16" chamfers
6 3/4"
9/16"
holes
D
JIB
FULL-SIZE
PATTERN
3/16" hole
3/16" hole
9/16"
holes
3/16" hole
Excavator
Page 62

COUNTRY-FRESH BLANKET CHEST BASE
FULL-SIZE END PATTERN

Ⓒ, Ⓓ

CASUAL CONTEMPORARY
BLANKET CHEST BASE
FULL-SIZE END PATTERN

Ⓒ, Ⓓ

Blanket Chest
Page 30

TRADITIONAL AMERICAN BLANKET CHEST BASE
FULL-SIZE END PATTERN

Ⓒ, Ⓓ

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14 Proven Tips for Fuss-Free Router-Bit Setup

Unless you're making many multiples of project parts, it almost always takes longer to set up for a cut than it does to actually rout the workpiece. Fortunately, over the years we've discovered shortcuts to make most setups a breeze.

1 Shim your fence for disappearing edges

When routing certain edge profiles on your router table, such as the door lip shown *above*, the bit removes enough stock that the profiled edge no longer bears against the outfeed fence. In these cases, shim the outfeed fence—we attached ⅛"-thick plastic laminate with double-faced tape—to provide a bearing surface for the workpiece beyond the bit. Without this, you'll end up cutting a snipe-like gouge when the edge clears the infeed fence.

2 Add a temporary depth stop

If a router bit hits the bottom of the collet, you can't tighten it fully, creating the potential for the bit to fly out in use. And with some routers it's difficult to hold the bit at the correct depth while simultaneously tightening the collet nut. To prevent this, slip a snug-fitting O-ring onto the bit shank to hold it in place while you tighten the nut. You could also drop a small rubber grommet into the spindle to prevent bits from bottoming out. When you tighten the nut the rubber will flex as the bit shank draws against it. (You'll find O-rings and grommets at most hardware stores.)

3 Trim only what you need

Flush trimming solid-wood edging on veneered plywood or MDF is a good job for a trim router because of its small base and low center of gravity. But even if you use a midsize router, set the bearing depth of the flush-trim bit just below the edge to be trimmed. This way, if you accidentally tip the router, you won't cut into the plywood's veneer. And when trimming away edging, rout in a climb-cut direction, right to left in this example, to avoid tearing out grain on the wood edging.

Save wear and tear and get cleaner cuts with incremental routing

When possible, trim away excess material from your workpieces at the tablesaw or bandsaw before routing. Trace the profile of the bit onto your stock to prevent overcutting, as shown. Whether you're routing an edge profile, sliding dovetail, or any other task that removes a good bit of wood, doing this will save you time, wear on your bits and router motor, and a pile of shavings.

For a flawless surface, always leave a tiny amount—1/64" should do it—for a final routing pass to remove burn or chatter marks. On a router table, before making the cut, apply masking tape to the workpiece edge or router-table fence, as shown (two layers if the tape is ultra-thin). Before the final pass, remove the tape for a whisker-thin shave. For handheld work, adhere two or three business cards to your router's subbase for the majority of the routing, and then remove them prior to the final pass.

Rather than adjust the bit's height as you remove material incrementally, set it to the exact height from the start and use removable shims on the table surface. Stack layers of ¼" hardboard or plywood on the table using double-faced tape, with cutouts around the bit, and then remove one layer after each pass. This proves especially helpful if your router or router lift is fussy to fine-tune because you set it once and lock it in.

Achieve dead-on measurements without a ruler

7 Use machined brass setup bars, typically sold in kits from ⅛" to ½" in thickness, to set bit depths with dead-on precision. For example, when using a tongue-and-groove bit set on ¾"-thick stock, set the groove cutter ¼" from the subbase or table surface, as shown at *right*. Then rout the tongue to fit the groove.

Brass setup bars: part #144932, $18, Woodcraft, 800-225-1153 or woodcraft.com.

8 After perfecting a setup, especially for mating two-bit setups, such as cope-and-stick bits or tongue-and-groove bits (shown), keep a piece of test stock from each bit to use as gauge blocks for quick setup on future jobs.

9 When routing through dovetails on a router jig, use your actual workpieces to accurately set the bit's cutting depth. First, tape a piece of scrap onto the face of the workpiece that will mate with the one you'll rout, letting it extend 1" or so from the end of the workpiece. Next, set the router in position on the jig's template with the bit tightened in the collet. Lower the bit until it touches the scrap piece for a dead-on setting. If you prefer to make your tails and pins a little proud to be trimmed after assembly, simply lower the bit another one-eighth turn of the router's depth-adjustment dial, and then lock the router's base.

10 Anytime you're routing hinge mortises, unfold the hinges and set the router onto one leaf of each. Then lower the bit until it touches the benchtop for the exact cutting depth for those hinges.

Fine-tune settings for spot-on precision

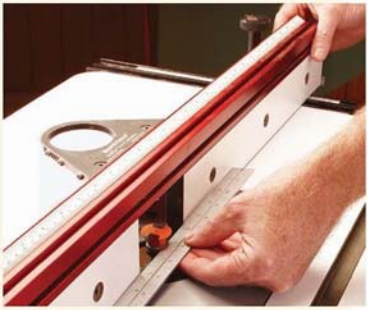
11 The gap between the bit and opening in the router's base sometimes makes it difficult to accurately set a bit's depth by standing a steel rule on end. Instead, use a rule with scales marked vertically on the ends, preferably in ½" increments.

Steel rules: 6" rule, part #13394, $12; 12" rule, part #13404, $20; Hartville Tool, 800-345-2396 or hartvilletool.com.

12 Many of today's routers come with a centering cone, used to center the subbase to the spindle. An exactly centered bit proves critical for joinery tasks that involve guide bushings, such as dovetails or box joints. Without being centered, your joints will likely not fit perfectly. If your router didn't come with a centering cone, get an aftermarket one for less than $10.

Router centering cone: part #RA1150, $6, Tool Barn, 866-597-3850 or toolbarn.com.

13 To position a router-table fence flush with a bit's bearing or a particular point on a bit's profile, get it close by eyeballing it, and then tighten down one end of the fence. Holding a steel rule against both fence faces, pivot the loose end until the rule hits the mark you want. Tighten the other end of the fence when the infeed and outfeed faces line up with your registration point on the bit.



14 When fine-tuning a bit's height with an above-the-table adjustment tool, such as the one shown here, make a pencil mark on the table and line it up with the scale's zero reference. Now when making fine adjustments up or down you will always know where you began, to avoid overshooting the starting point should you have to back up.

Written by **Bob Hunter** with **Kevin Boyle** and **Jeff Mertz**

Mantel Clock

Build this showpiece in no time.

AT A GLANCE

- Stack router-made profiles to create attractive moldings.
- Features a set-it-and-forget-it press-in clock movement.

Another option: Redwood burl makes a striking timepiece.

Maybe you can't save time in a bottle, but you can build this beautiful clock to track its passage. Dress up a simple mitered case with a few shop-made moldings, then install an inexpensive battery-powered clock works. (See **Source** on *page 56*.) It's a great way to pass a few hours in the shop.

Build a case for the face

1 Cut the front (A) and sides (B) to length [**Materials List**, *page 56*, **Drawing 1**]. With the blade tilted to 45°, bevel-rip both edges of the front to bring it to finished width. Then bevel-rip one edge of each side to finished width. Rout a ¼" rabbet on the opposite edge of the sides.

2 Lay out on the front (A) the hole for the press-in clock movement [**Drawing 1**]. Drill a starter hole inside the layout line and cut just inside the line with a jigsaw or scrollsaw. Sand up to the line with a drum sander, testing the fit of the clock movement as you go.

Note: *To maintain a snug fit, don't press in the movement fully.*

3 Assemble the front (A) and sides (B) [**Photo A**]. After the glue dries, finish-sand the case (A/B) to 220 grit, preserving the sharp corners at the edges and ends.

Time to make moldings

1 Cut the top and bottom (C), cove molding (D), cap (E), handle block (F), and base (G) to size. Set the base aside for the moment.

2 ***Quick Tip! Rout ends, then edges.*** When routing profiles, rout across an end first and back up the cut with a piece of scrap [**Photo B**]. Any chip-out gets cleaned up when routing the adjacent long edge. Rout ⅜" coves on three sides of the top and bottom (C) and cove molding (D), leaving the back edge square [**Drawing 2, Photo B**]. Change to a ½" round-over bit and rout the ends and edges of the cap (E). Next, set up a ¼" core-box bit ¼" above the table and rout a groove around all four edges of the handle block (F) [**Photo C**].

3 At the tablesaw, trim ⅛" from the lower ends and edges of the handle block (F) [**Drawing 2, Photo D**]. Back at the router table, rout a ⅛" round-over on the underside of the block's top edge [**Photo E**]. Then lower the bit and flip the handle block over to complete the profile [**Drawing 2**].

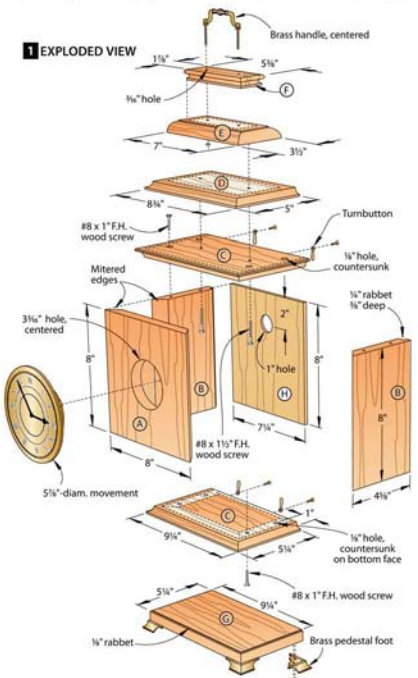
4 Retrieve the base (G) and rout ⅛" rabbets ⅛" deep around the top edge [**Drawing 2**]. Sand the trim pieces (C–G) to 220 grit.

A Hold the miter joints together with painter's tape, then apply strips across the opening to hold the case together while the glue dries.

B Use a backer board to push the workpiece and back up the end-grain cut. Start with the bit low to allow for a final cleanup pass.

C Support the handle block (F) with a push-block and vertical backer board. Rout an end first, then work your way around the block.

D Set the blade about ⅛" above the table and trim ⅛" from the ends of the handle block (F). Then trim the long edges.



Tick "assembly" off the list

1 On the top face of the top (C), mark lines 1" in from each end. Then draw lines on the back edge ⅜" from the ends. Position the top on the case (A/B) **[Photo F]**, then drill ⅛" countersunk pilot holes and screw the top in place.

2 Draw lines centered on the back edges of the top (C) and cove molding (D). Then glue and clamp the cove molding to the top with the centerlines aligned and with their back edges flush **[Photo G]**. Glue the handle block (F) to the cap (E), centered. When the glue has dried, drill ⅛" holes for the handle through the top assembly (E/F) **[Drawing 2]**. Then drill ½" counterbores for the handle nuts.

3 Using double-faced tape, temporarily center the top assembly (E/F) on the case (A–D). Flip the assembly (A–F) over and drill two countersunk screw holes **[Drawing 2, Photo H]**. Remove the tape and drive screws (don't use glue) to secure the top assembly.

4 Using the same method as in **Step 1** *above*, screw the bottom (C) to the

E
To provide more support for the handle block (F) as you rout the ⅛" round-overs, align the fence with the bearing of the bit.

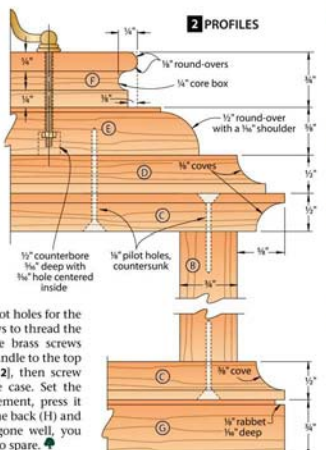
F
Align marks on the edge of the top (C) with the edges of the case (A/B). Drill for two screws along each line on top of the case top.

G
Centerlines on the back edges of the cove molding (D) and top (C) make it easy to align the pieces during glue-up.

case assembly (A–F); then glue the base (G) to the bottom. Cut the back (H) to fit between the rabbets in back of the case and drill a 1" finger-pull hole [**Drawing 1**]. Set the back aside for the moment.

5 Remove the top assembly (E/F) and apply a finish to all parts. (We used boiled linseed oil, topped with aerosol satin polyurethane, sanding between coats with a 320-grit sanding sponge.)

6 After the finish has cured, turn the clock upside down, drill ⅛" pilot holes for the feet, and drive steel screws to thread the holes before driving the brass screws [**Drawing 1**]. Secure the handle to the top assembly (E/F) [**Drawing 2**], then screw the top assembly to the case. Set the time on the clock movement, press it into the case, then add the back (H) and turnbuttons. If all has gone well, you should finish with time to spare.



Clamp the top and case (A–F) to your bench. Then, drill holes to secure the top assembly (E/F), avoiding the handle counterbores.

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
A*	front	¾"	8"	8"	C	1
B*	sides	¾"	4⅛"	8"	C	2
C	top/bottom	½"	5¼"	9¼"	C	2
D	cove molding	½"	5"	8¾"	C	1
E	cap	⅜"	3½"	7"	C	1
F	handle block	¾"	1⅜"	5⅛"	C	1
G	base	¾"	5¼"	9¼"	C	1
H	back	¼"	7¼"	8"	BP	1

*Parts initially cut oversize. See the instructions.

Materials key: C–cherry; BP–birch plywood.
Supplies: Double-faced tape, #8x1" flathead wood screws (8), #8x1½" flathead wood screws (2).
Bits: ¼" straight, ¼" round-over, ¼" core-box, ½" round-over, ⅜" cove router bits; ½", 1" drill bits.

Source

Hardware kit contains: 5⅛"-diam. quartz clock movement, brass handle (2¾" centers), ⅛x1½" brass pedestal feet (4), and 7/16" turnbuttons (4). Kit no. 26888, $39.99, Klockit, 800-556-2548, klockit.com.

Cutting Diagram

¾ x 9¼ x 72" Cherry (5 bd. ft.)
*Plane or resaw to the thicknesses listed in the Materials List.

¼ x 12 x 12"
Birch plywood

Written by **Craig Ruegsegger** with **Jeff Mertz**
Project design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

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SHOP TESTED

The Best Tablesaw Blades Under $50

Tools Editor Bob Hunter examines a test sample for cut quality. We rubbed chalk on the samples to reveal any scoring or ripple marks caused by the blades.

If you can't bring yourself to spend $120 on a tablesaw blade, we have good news for you. We tested nearly four dozen rip, crosscut, and multipurpose blades—all selling for less than half that price—and found several that deliver cut quality almost as good as the leading premium blades.

Yeah, but exactly *how* good are they?

There's a reason premium-priced blades cost as much as they do: They typically perform flawlessly when paired with a well-tuned tablesaw. But if you're willing to joint, sand, or plane away light scoring marks on end and edge grain—something many of us do anyway, regardless of the blade used—you can get by nicely with the blades recommended here.

For comparison, we put two proven, premium 40-tooth blades—a Forrest Woodworker II and Freud Premier-Fusion P410—through the same paces as the sub-$50 blades, and they set the standards for what constitutes an A grade in each cut. Although none of the lesser-priced blades posted across-the-board A marks, more than half delivered Bs or higher.

Key findings

■ **Some blades do it all.** For most of the work you'll do with hardwoods and softwoods, a 40-tooth general-purpose or 50-tooth combination blade delivers good to excellent results. But sheet goods, such as veneered plywood and melamine-coated particleboard, require either a premium multipurpose blade or a specialty blade (selling for $65 to $90) made just for those materials. As evident in the performance chart on the *next page*, none of the tested blades could crosscut birch plywood without tearing the grain on the unsupported bottom side. However, you can improve the performance of most of these blades by about one letter grade simply by using a zero-clearance insert on your tablesaw.

■ **Thin is in.** Most 10" blades under $50 cut a thin kerf measuring between .120" and .090". The only full-kerf blade that earned our approval is the Amana Prestige PR1040 (.134", just over ⅛"). Our 1¾-hp hybrid tablesaw handled that blade without bogging down, but lesser-powered saws perform best with one of the top-rated thin-kerf blades.

■ **Throwaway blades.** Because sharpening services charge about $20 to $35 to resharpen a blade (depending on the number of teeth and the grind geometry), some woodworkers dispose of these blades after they become dull. And because the carbide tips tend to be smaller than those of premium blades, you'll get fewer sharpenings if you do go that route.

continued on page 60

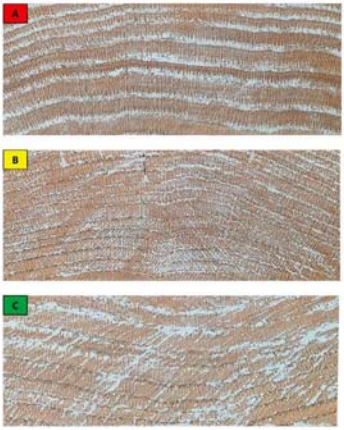
TEAR-OUT EVALUATION RATINGS

(Bottom plywood face shown; cuts made without zero-clearance insert)

RATING:

- A = No tear-out on top and bottom faces
- B = No tear-out on top face, slight tear-out on bottom face
- C = Little to no tear-out on top face, significant tear-out on bottom face

CUT-SCORING EVALUATION RATINGS



RATING:

- A = Absence of blade marks; joint-ready
- B = Blade marks require light sanding
- C = Blade marks require heavy sanding

THE BEST TABLESAW BLADES UNDER $50

MANUFACTURER	MODEL	KERF WIDTH, INCHES	PERFORMANCE RATINGS (1,2)										SELLING PRICE (3)	FOR MORE INFORMATION:	
			¼"-THICK HARD MAPLE				1¼"-THICK RED OAK				¾" BIRCH PLYWOOD				
			ABSENCE OF:				ABSENCE OF:				ABSENCE OF:				
			RIP-CUT SCORING	RIP-CUT TEAR-OUT	CROSSCUT SCORING	CROSSCUT TEAR-OUT	RIP-CUT SCORING	RIP-CUT TEAR-OUT	CROSSCUT SCORING	CROSSCUT TEAR-OUT	RIP-CUT TEAR-OUT	CROSSCUT TEAR-OUT		PHONE NUMBER	WEB SITE
40-TOOTH GENERAL-PURPOSE BLADES															
AMANA	PRESTIGE PR1040	0.134	A	A	A	A	B+	A	B+	A	A	B+	$49	800-445-0077	amanatool.com
CRAFTSMAN	PROFESSIONAL 32808	0.098	B+	A	A	B	A-	A	B+	B	A	B-	$40	800-383-4814	craftsman.com
DEWALT	DW3114	0.095	B	A	B	A	B-	A	B+	B+	A	B	$25	800-433-9258	dewalt.com
	DW7140PT	0.098	B+	A	B	B+	B+	A	B+	B+	A	C	$30		
FREUD	DIABLO D1040X	0.098	B+	A	A	A	A-	A	B+	A	A	B-	$37	800-334-4107	diablotools.com
	LU86R010	0.094	B	A	B+	A	B	A	B+	A-	A	B-	$44	800-334-4107	freudtools.com
IRWIN	MARATHON 14070	0.095	B	A	B-	B+	C	A	B-	A-	A	B-	$24	800-464-7946	irwin.com
50-TOOTH COMBINATION BLADES															
CMT	256.050.10	0.100	B	A	B-	A-	B	A	B-	A	A	B	$44	888-268-2487	cmtusa.com
DEWALT	DW7150PT	0.098	B	A	B	A	B+	A	B+	A	A	B	$40	800-433-9258	dewalt.com
FREUD	DIABLO D1050X	0.098	B+	A	B+	A	A-	A	B	A-	A	B-	$39	800-334-4107	diablotools.com
RIDGID	R1050C	0.100	B+	A	A	A	B+	A	A	A-	A	B-	$40	866-539-1710	ridgid.com
RIP BLADES															
CMT	250.024.10	0.098	B-	A	N/A		C	A	N/A				$36	888-268-2487	cmtusa.com
FREUD	DIABLO D1024X	0.098	B-	A	N/A		B-	A	N/A				$30	800-334-4107	diablotools.com
	LU87R010	0.094	B	A	N/A		B	A	N/A				$42	800-334-4107	freudtools.com
INFINITY	010-124	0.100	B	B-	N/A		A	A	N/A				$49	877-872-2487	infinitytools.com
60-TOOTH CROSSCUT BLADES															
DEWALT	DW3106	0.095	N/A		B-	B+	N/A		A-	A	A	B-	$30	800-433-9258	dewalt.com
FREUD	DIABLO D1060X	0.098	N/A		B+	A	N/A		B	A-	A	B	$42	800-334-4107	diablotools.com
IRWIN	CLASSIC 15370	0.103	N/A		A-	A	N/A		A-	A	A	B-	$25	800-464-7946	irwin.com
	MARATHON 14074	0.095	N/A		B-	B	N/A		B-	A-	A	B+	$30		
OLDHAM	10060TP	0.118	N/A		B+	A	N/A		A-	A	A	B-	$20	800-433-9258	oldham-usa.com
80-TOOTH CROSSCUT BLADES															
DEWALT	DW3218PT	0.098	N/A		A-	A	N/A		A	A-	A	B+	$49	800-433-9258	dewalt.com
FREUD	DIABLO D1080X	0.098	N/A		A-	A	N/A		A	A	A	B+	$49	800-334-4107	diablotools.com

1. A Excellent; B Good; C Fair; N/A Not applicable; blade not designed for this purpose
2. All test cuts made without zero-clearance tablesaw insert.
3. Prices current at time of article production and do not include shipping, where applicable.

Our recommendations

All the blades in the chart *above* performed well given their price, but the blades shown *below* nudged ahead of the field to gain our Top Tool endorsement:

The Top Value honor goes to the 60-tooth Irwin Classic 15370. This $25 crosscut blade earned grades of A- or better in five of six crosscutting categories.

Written by **Bob Hunter** with **Bob Baker**

Amana Prestige PR1040,$49

Freud Diablo D1040X, $37

Ridgid R1050C, $40

Irwin Classic 15370, $25

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Construction-Grade Excavator

AT A GLANCE

- Overall dimensions: 19⅛" long × 6" wide × 6⅞" high with the bucket at ground level
- Bucket capacity: Approx. .00008 cu. yd. (3.75 cu. in.)
- Boom reach: 14"
- Dig depth: 8¼"
- Engine rated at 1 kidpower, continuous duty

Put this toy and a pile of marbles or Legos in front of children and watch them while away the time scooping and moving them. The excavator shares design elements with the crane in issue 185 (September 2008), page 68 [**More Resources**, *page 65*].

We start with a bucket, then boom

1 From ¾"-thick stock, cut the bucket bottom (A) and bucket back (B) to size [**Materials List**, *page 65*]. Glue the pieces together with the grain running in the same direction [**Drawing 1**].

2 Make two copies of the **Bucket Side Pattern** from the *WOOD Patterns®* insert, *page 46*, and set one aside. Trim the other along the dashed lines around parts A and B, and adhere the pattern to the bucket assembly (A/B). Cut away the inside waste at the bandsaw [**Photo A**].

3 Cut the bucket sides (C) to size and apply the remaining **Bucket Side Pattern** to one. Stack the bucket sides with their edges flush and drill holes where indicated. Cut two 2¾" lengths of threaded rod [**Shop Tip,** *opposite*], and screw an acorn nut onto one end of each. Glue and clamp the bucket sides to the bucket (A/B) [**Photo B**].

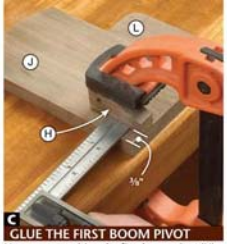
4 Make two copies of the **Boom Side Pattern** and one copy of the **Jib Pattern**. Spray-mount them to your stock, then cut and sand the jib (D) and boom sides (E) to shape. Spray-mount a copy of the **Cab Pattern** to a piece of 1½"-thick stock (or laminated ¾" stock) and cut the cab (F) to shape. Drill the holes where indicated on the patterns, then chamfer the edges. Sand the parts to 150 grit, then glue the Shaker peg into a boom side [**Drawing 1**]. ***Note:*** *The peg can go on either boom side.*

A CUT THE BUCKET TO SHAPE

Bandsaw just outside the line inside the bucket, then sand to the line using a spindle sander. Use a ⅛" or ¼" blade to cut this curve.

B CROSS THIS OFF YOUR BUCKET LIST

Align the dashed lines on the pattern with the edges of the bucket (A/B). Threaded rod through the bucket sides (C) aligns them.



C GLUE THE FIRST BOOM PIVOT

Measure to position the first boom pivot (H). Glue the pivot in place with the narrow end flush with the end of the pivot table (J).

5 Apply one copy of the **Jib Lever Pattern** and two copies of the **Boom Pivot Pattern** to ½" stock, and cut the jib lever (G) and boom pivots (H) to shape. Cut the jib pistons (I) to shape following the **Jib Piston Pattern**. Sand away the patterns and any mill marks with 150-grit sandpaper. Cut five lengths of threaded rod for the boom [**Drawing 1**], then set the bucket (A/B/C), boom pieces (D, E, G, H, I), and cab (F) aside.

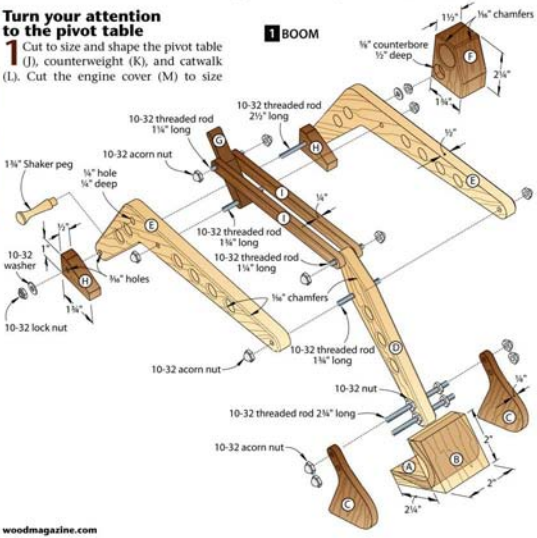
Turn your attention to the pivot table

1 Cut to size and shape the pivot table (J), counterweight (K), and catwalk (L). Cut the engine cover (M) to size [**Drawing 2**] and apply a copy of the **Engine Cover Pattern** to it. Drill the holes in the engine cover, counterweight, and pivot table [**Drawing 2**]; then rout roundovers on the counterweight and engine cover. Glue the smokestack into the engine cover and set the cover aside.

2 Glue the catwalk (L) to the pivot table (J) with the top and front ends flush [**Drawing 2**]. Then, glue a boom pivot (H) to the pivot table [**Photo C**]. After the glue sets, glue the remaining boom pivot in place [**Photo D**].

3 Glue and clamp the counterweight (K) to the pivot table (J) against the boom pivots (H) and centered side-to-side. To center the counterweight hole over the hole in the pivot table, push a bolt through both holes.

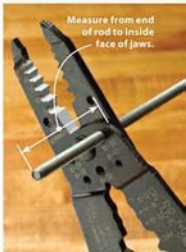
4 Assemble the jib (D), boom sides (E), jib lever (G), and jib pistons (I) with threaded rod and acorn nuts [**Drawing 1**].



SHOP TIP

Cutting threaded rod: It's a snap

Cut 4-, 6-, 8-, and 10-gauge threaded rod quickly and cleanly with a pair of wire stripper/cutters. Thread the rod into the appropriately sized hole in the tool, *below*, then shear it to length. Twist the rod out of the cutter, and the tool cleans up the cut threads. Find stripper/cutters at most hardware and home-improvement stores for about $20.



D
GLUE THE SECOND BOOM PIVOT

Use a boom side (E) and threaded rod to position the second boom pivot (H). The boom should move with very light resistance.

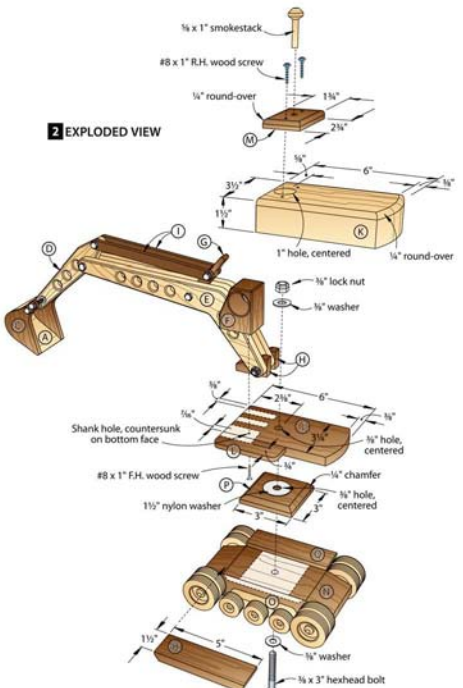
E
DRILL AXLE HOLES

Use a drill-press fence to position the chassis (N). Drill halfway through one side, then flip the chassis over and complete the holes.

F
ATTACH THE WHEEL COVERS

Align the top of the wheel covers (Q) with the bottom edge of the chamfer on the turntable (P) and centered on the turntable's length.

2 EXPLODED VIEW



Attach this assembly to the boom pivots (H). Then screw (don't glue) the cab (F) to the pivot table (J). This allows for removing the cab to adjust resistance on the boom arm.

Fabricate a massive chassis

1 Cut the chassis (N) to size and lay out the tapers and axle holes on both sides [**Drawing 3a**]. Drill the ⅜" hole and counterbore centered on the bottom [**Drawing 3**]. Then cut the tapers and drill the axle holes [**Photo E**].

2 Adhere two copies of the **Wheel Spacer Pattern** to ¾"-thick stock. Cut the wheel spacers (O) to size, and drill the holes. Glue the spacers to the chassis (N), centered between the ends and flush at the bottom [**Drawing 3a**].

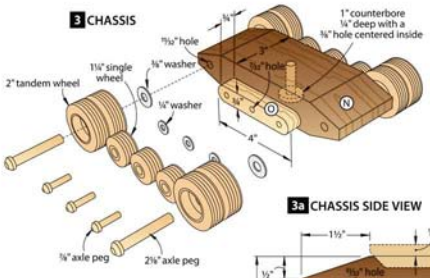
3 Cut the turntable (P) to size and chamfer the top edges [**Drawing 2**]. Glue and clamp the turntable to the chassis, centered. After the glue dries, drill through the turntable, using the hole in the chassis as a guide.

4 Spray-mount two copies of the **Wheel Cover Pattern** to ½" stock and cut the wheel covers (Q) to size and shape. Glue the covers to the chassis [**Drawing 3a, Photo F**].

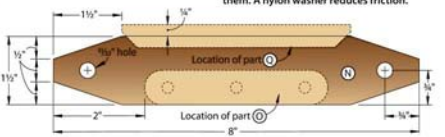
5 If needed, sand the axle pegs to fit snugly in the axle holes in the chassis (N) and wheel spacers (O). Cut ⅛" from the ¾"-long pegs [**Drawing 3**]. Test the fit of the wheels and axles, but don't glue them in place.

Finish and assemble

1 Remove the wheels, axles, and all of the hardware and apply a finish. (We sprayed on two coats of polyurethane, buffing between coats with a 320-grit sponge.) After the finish has dried, reassemble the boom (A/B/C, D, E, G, I) using thread lock on all acorn nuts. Attach the boom assembly and cab (F) to the pivot-table assembly (H/J/K/L).



To remove wobble but allow the assemblies to pivot, snug a lock nut onto the bolt joining them. A nylon washer reduces friction.

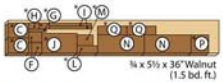


2 Place a wheel and a washer on each axle peg and glue the pegs in place, making sure no glue gets on the wheels and that the wheels turn freely [**Drawing 3**]. After the glue dries, bolt together the chassis assembly and pivot table/boom assembly [**Photo G**]. Then screw the engine cover (M) in place [**Drawing 2**].

3 Power up the "engine" with cookies and milk, point the kids toward the marble quarry and let them dig in.

Written by **Craig Ruegsegger** with **Kevin Boyle**
Project design: **Jeff Mertz**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

Cutting Diagram



¾ x 5½ x 36" Walnut (1.5 bd. ft.)

¾ x 5½ x 48" Maple (2 bd. ft.)

*Plane or resaw to the thicknesses listed in the Materials List.

Materials List

Part		FINISHED SIZE T	W	L	Matl.	Qty.
Boom						
A*	bucket bottom	¾"	2"	2¼"	M	1
B*	bucket back	¾"	2"	2"	M	1
C*	bucket sides	¾"	2½"	3½"	W	2
D*	jib	½"	1¼"	6¾"	M	1
E*	boom sides	½"	3⅛"	11⅜"	M	2
F*	cab	1½"	1¾"	2¾"	W	1
G*	jib lever	½"	½"	3"	W	1
H*	boom pivots	½"	1"	1¾"	W	2
I*	jib pistons	¼"	½"	7¼"	W	2
Body						
J	pivot table	½"	3¼"	6"	W	1
K	counterweight	1½"	3½"	6"	M	1
L	catwalk	¾"	1¼"	3½"	W	1
M	engine cover	½"	1¾"	2¾"	W	1
Undercarriage						
N	chassis	1½"	3"	8"	W	1
O*	wheel spacers	¾"	¾"	4"	M	2
P	turntable	½"	3"	3"	W	1
Q	wheel covers	½"	1½"	5"	W	2

*Parts cut from blanks using patterns. See the instructions.

Materials key: M–maple; W–walnut.
Supplies: Spray adhesive, #8x1" flathead wood screw (1), #8x1" roundhead wood screws (2), blue thread lock.
Bits: ¼" round-over, 45° chamfer router bits; ⅛", 1" Forstner bits; ⅛" drill bit.

Source

Wood/hardware kit: Contains the following wood parts and hardware: 2" tandem wheels (4), 2½" axle pegs (4), 1¼" single wheels (6), ¾" axle pegs (6), 1¾" Shaker peg (1), 1½" nylon washer (1), ¾x1" smokestack (1), 10-32 lock nuts (2), 10-32 acorn nuts (12), 10-32 nuts (4), 10-32x12" threaded rod (2), 10-32 washers (2), ¼" washers (6), ⅛" washers (6), ¾x3" hexhead bolt (1), ¼" lock nut (1). Order kit no. 3200, $24.95 plus shipping, Meisel Hardware Specialties, 800-441-9870, meiselwoodhobby.com.

MORE RESOURCES

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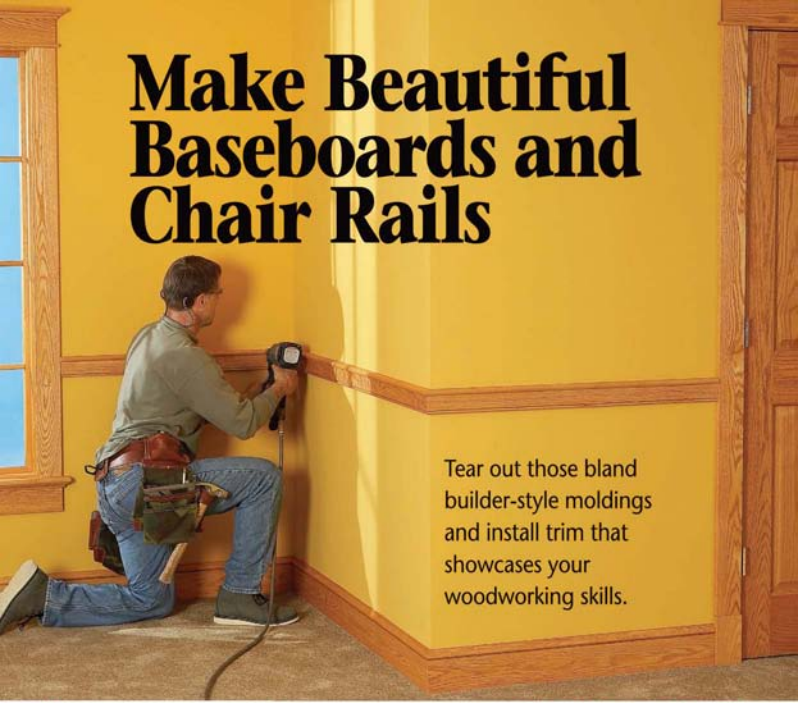
Make Beautiful Baseboards and Chair Rails



Tear out those bland builder-style moldings and install trim that showcases your woodworking skills.

DIY MOLDING: PART 2

This is the second of two articles on customizing the molding in your home. For tips on making and installing door and window trim like that shown here, see issue 193 (October 2009) or purchase the article by going to woodmagazine.com/dwtrim.

Most of the wood trim in today's homes was meant to be ignored, not admired. If you look around at the skinny baseboards and chair rails in your home and think, *I could do better,* you're probably right. Making and installing custom baseboards and chair rails adds personality and value to your home.

When choosing baseboard profiles, first decide whether you want a one-piece molding or one built up from two or more pieces [**Photo A**]. A single molding saves you time and money, but a built-up molding lets you combine pieces for a dramatic, extra-wide profile. Then decide between stained or painted moldings. Stained or clear-finished moldings need to be cut from straight, clear wood. A layer of paint, though, can hide inexpensive stock, such as a poplar cap, or an MDF baseboard.

There's no rule dictating what molding size or style looks best in your home. In general, a roomy house with ceilings higher than 8' accommodates trim wider than the common 2½" baseboard width.

3-PART MOLDINGS HIDE FLAWS

A

The flexible cap follows waves in the wall that the baseboard can't. The shoe molding hides hard-surface floor imperfections.

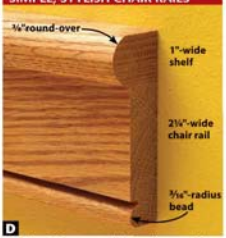
MOCK-UPS HELP YOU CHOOSE

To visualize how a room will look with new moldings, compare samples of various sizes. Omit the shoe molding on carpeted rooms.

MIX BITS FOR CUSTOM PROFILES

Using one bit lets you create a symmetrical profile, while combining two different bits creates this look. (See **Sources**.)

SIMPLE, STYLISH CHAIR RAILS



Use 15- or 16-gauge nails to wall-mount the chair rail and shelf. To not split the chair rail, fasten the shelf to it with 18-gauge brads.

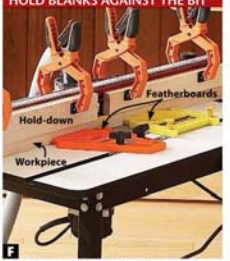
To help you decide what you want, gather molding ideas from magazines, historic homes, real estate open houses, and router bit manufacturers' Web sites. Then pick a few styles, mock up short samples against a wall [**Photo B**], and live with them until you settle on your favorite size and combination.

Like baseboards, chair rails can be fashioned from a single molding or combination of moldings. A variety of router bits used individually or in pairs create custom chair-rail designs [**Photo C**]. In the room shown *opposite*, we topped a beaded chair rail with a beaded-edge shelf [**Photo D**].

HELP PROFILES COME TOGETHER

A plinth block below the door side casing creates a transition between the casing and baseboards of different thicknesses

HOLD BLANKS AGAINST THE BIT



Hold-downs and featherboards attached to this router table keep long molding blanks under control for smooth, consistent cuts.

Gear up to make moldings

Baseboards and chair rails fit between door and window casings, so install that trim first [**Photo E**]. (See *DIY Molding: Part 2* on *page 66*.) When estimating and preparing stock to rout for molding, joint and plane two extra strips for each type of molding to allow for routing tear-out, miscuts, and other mishaps.

Now set up your shop to mass-produce moldings out of blanks at least 8' long (to minimize splices on long walls). That means table-mounting a variable-speed, 3-hp router that can handle large molding bits. Then add infeed and outfeed supports, featherboards, hold-downs, and dust collection [**Photo F**]. While routing, maintain a steady feed rate without pauses that leave burn marks.

The most carefully routed moldings still need to be sanded up to 180 grit using pads, sanding sponges, or contoured blocks that follow the molding profile. You can stain the moldings before installation, as we did here, but apply a clear finish after cutting joints and patching nail holes.

Common hand tools help you handle most installations, but a mitersaw makes the job easier. You'll also work faster using a 15- or 16-gauge pneumatic nailer with 2¼" or 2½" nails to attach trim to walls. Use an 18-gauge nailer with 1¼" or 1½" brads to attach moldings to each other. You'll also need a 3' level, a 6' or 8' straightedge, tape measure, coping saw or jigsaw with a narrow 20-tooth-per-inch blade, a hammer, and nail-pulling pliers. (See the **Shop Tip** *below*.)

SHOP TIP

Remove nails with care

Sooner or later, one of your nails will strike a hidden knot, drywall nail, or some other obstacle. Be ready with a pair of end cutters or pliers designed to grip even a small nail head. Place a shim or scrap beside the nail to protect the baseboard, and use the shape of the pliers to leverage the nail out of the wood.

Begin with the baseboards

First check walls for severe dips that will create gaps behind baseboards and chair rails [**Photo G**]. Then locate wall studs to attach the baseboards and chair rails [**Photo H**]. Mark these plus the chair-rail mounting heights at each stud—typically 36" above the floor.

Follow these general rules when planning your job:

- Avoid coping both ends of a trim piece. That makes it hard to cut accurate lengths. (Watch a free cope-cutting video at woodmagazine.com/copecut.)
- Cut baseboards and caps starting with the longest pieces first. That way, any miscut pieces can be reused elsewhere in the room.
- On walls longer than your longest piece of trim, join two pieces with a 45° scarf joint [**Photo I**]. Place the joint somewhere inconspicuous, such as behind an open door, and in front of a stud. Glue the joint ends and then drive 15- or 16-gauge nails through both pieces and into the stud to eliminate gaps.

In a typical room with four inside corners and one entry where you're using moldings with profiles, for example, first cut the piece for the longest wall using straight-cut ends. Add an extra ⅛" to the length of the wall and cut the molding this length. Then bow it slightly, and pop it into place for a snug fit in the corners.

For walls 90° to the long wall, cut coped ends to go against the long-wall molding and squared ends to go against the opposite wall or any doorway casing in between. Only as a last resort would you cut molding for the remaining wall with cope cuts on both ends.

That's the plan; now let's go to work on the baseboards. Unlike the controlled world of the workshop, you'll need to work around drywall flaws in most houses. For example, inside wall corners become rounded because of built-up joint compound. To compensate, sand a round-over on the inside end grain of your baseboards to fit these corners. Now fasten the first piece into the wall studs using a 15- or 16-gauge nailer.

With no profile to cope-cut for the simple baseboards shown here, simply butt the ends of the adjoining pieces against your first baseboard until you've worked your way around the room. On outside corners, miter the end so the inside face ends flush with the corner. Then cut the mating miter, glue the joint, and attach the baseboard with

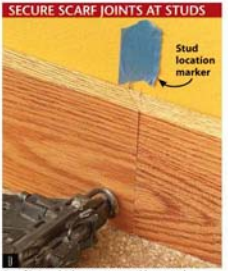
CHECK FOR WALL FLAWS

A wall dip this severe needs to be patched with joint compound, primed and repainted before you install a chair rail.

FIND STUDS FOR NAILING TRIM

From a nail marking one stud, mark the remaining studs every 16". Use a level to transfer marks for nailing the chair rails.

SECURE SCARF JOINTS AT STUDS



Scarf joints hide gaps caused by wood movement. Nails pass through both pieces and into a stud.

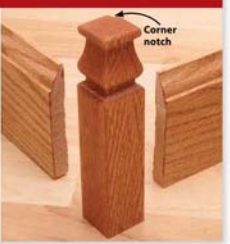
NAIL OUTSIDE CORNER MITERS

Gluing and then nailing corners on both faces helps keep outside miters from separating due to impacts and wood movement.

SHOP TIP

Hate miters? Try this miterless alternative

In the same way that corner blocks eliminate mitered door-casing corners, these corner blocks eliminate outside corner miters in baseboard moldings. They also withstand bumps from shoes and vacuums. To make them, cut blanks about 1" to 1½" square, and add a ¼" round-over to the three exposed edges. For a decorative touch, rout the top end on all four faces. Then add either a ¼" notch for outside corners or chamfer for inside corners to allow for drywall imperfections.



Cope molding ends for gap-free corner joints

A MITER REVEALS THE PROFILE

K
A 45° miter on the end you'll cope reveals the profile (*inset*). Saw as close as possible to the miter edge without breaking the face of the molding.

COPE MOLDINGS QUICKLY

L
To make cope cuts faster, clamp a coping jig (see **Sources**) to the molding and jigsaw the shape using a 20-teeth-per-inch blade.

FINE-TUNE THE PROFILE

M
When cleaning up a cope cut with a rasp or sanding block, create a slight back bevel for a tight joint on the outside faces.

COPE CAPS ON INSIDE CORNERS

N
The coped-end cap mates with the butt-end molding and allows the cap end against the wall to shrink without leaving a gap.

15- or 16-gauge nails. Reinforce the joint with 18-gauge brads [**Photo J**].

Now you're ready to add the cap—again starting on the longest wall and bowing a ⅛"-overlong piece to fit. Because it's narrower and less rigid than the baseboard, the cap hides dips and curves in the drywall. So press it firmly against both the wall and baseboard before fastening it through to the wall studs using an 18-gauge nailer.

For inside corners, cope the ends of caps that will butt up against your first cap with its square-cut ends. To cope-cut an end, first reveal the profile by cutting a 45° miter, as though making an inside mitered corner. Then saw on the waste side near the miter edge using a coping saw [**Photo K**] or jigsaw [**Photo L**] and coping jig. (See **Sources**.)

Use a rasp or a ¾" dowel wrapped with 80-grit abrasive to match the profile to the miter edge [**Photo M**]. Test the coped end profile against a cap-molding scrap or an installed cap [**Photo N**].

Plan the cap layout to make a square cut or outside-corner miter on the other ends of any cope-cut pieces and work your way around the room. (For a hardwood floor not shown, install shoe moldings the same way to hide gaps between the baseboard and floor.) Then, putty nail holes to match the wood.

Install wall moldings like a pro

Builder and finish carpenter David Fish of Des Moines shares the following tips to help you successfully install baseboards and chair rails:

▶ When cutting baseboards with miters on both ends, gradually shorten them to the correct length. To do this, David butts one end against the stopped blade of his mitersaw, lifts and starts the saw, and cuts off just a hair at a time.

▶ For walls that meet at an angle other than 90° on inside corners, create a back bevel, as shown at *far right*, on the baseboard ends so the front faces butt together without gaps.

▶ Instead of using a level to determine chair-rail mounting lines around a room, measure up from the floor. Your eyes automatically use the floor for reference to tell whether the chair rail slants.

▶ Cut chair-rail shelf miters with the top face up to minimize visible tear-out. The chair rail hides tear-out on the underside of the shelf.

▶ To cut chair-rail outside corners, miter-cut the workpiece slightly overlong and hold it in position. Then butt a scrap miter against the workpiece miter and check for gaps. Gradually shorten the workpiece until you see a tight miter and no gaps, as shown *below.*

FIT MOLDINGS TIGHT TO WALLS

Cut moldings to length with no gap at the miter or gaps between the molding and the wall caused by parts cut too long.

BACK BEVEL FOR A FLUSH FIT

A carpenter's pencil under the workpiece helps you cut a back bevel to compensate for odd wall angles at inside corners.

NAILS PREVENT MITER GAPS

A dab of glue on the miters and 18-gauge nails lock the joints together. Use the same nails to attach the shelf to the chair rail.

MITER CHAIR RAILS, SHELVES

This chair rail shelf profile would be tough to cope cut, so in this case you would miter the corners for an attractive joint.

EASE MOLDING TRANSITIONS

To avoid sharp jutting edges on the shelf, chamfer the end to transition it to the adjoining door frame.

Now add chair rails

Walls that were flat at the baseboards may still have waves at chair-rail height. Check walls with a straightedge or taut string. Then patch dips with joint compound and repaint.

Because both the chair rail and shelf shown have routed profiles that don't lend themselves to cope-cuts, miter the inside and outside corners. As with the baseboard, begin by miter-cutting a chair rail to fit the longest wall first. Attach that section with a 15- or 16-gauge nailer at the studs marked earlier.

If the next piece goes between two inside corners, measure for length and miter the ends with gradual cuts until you achieve a tight fit. (See "Install wall moldings like a pro," *above*.)

When working from an inside corner to an outside corner, first miter the inside corner end and hold it in position while you mark the miter location at the outside corner. Cut on the waste side of that mark until the miter fits flush with the corner.

Then attach the shelves to the chair rails using an 18-gauge brad nailer on the top and to the wall from the front with a 15- or 16-gauge nailer [**Photo O**]. Miter inside shelf corners to match the chair-rail corners [**Photo P**]. Where the shelf meets door or window trim, chamfer the shelf end to create a transition [**Photo Q**] with no sharp corners.

With the molding installed, patch the nail holes using oil-based wood putty, and apply two coats of clear finish.

Written by **Bob Wilson** with **David Fish**
Molding design: **Kevin Boyle**
Illustrations: **Roxanne LeMoine**; **Lorna Johnson**

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Sources

Chair-rail bit set. Upper bit no. 99-477, 555 and lower bit no. 99-478, 558 (prices on Amazon.com), Freud America, freudtools.com.
Coping jig. BaseCoper no. 03J75.82, $14.50, Lee Valley Tools, 800-871-8158 or leevalley.com.

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Bob Vila endorses and recommends the famous EdenPURE® portable heater

Millions of Americans now saving up to 50% on their heating bills and raving about the "heavenly heat"

Does not get hot, cannot start a fire and will not reduce humidity or oxygen

The famous infrared portable heater, the EdenPURE®, which can cut your heating bills by up to 50%, has been greatly improved.

The new EdenPURE® GEN3 heater heats better, faster, saves more on heating bills and runs almost silent.

The EdenPURE® can pay for itself in a matter of weeks and then start putting a great deal of extra money in your pocket after that.

A major cause of residential fires in the United States is portable heaters. But the EdenPURE® cannot cause a fire. That is because the advanced infrared heating element never gets to a temperature that can ignite anything.

The outside of the EdenPURE® only gets warm to the touch so that it will not burn children or pets.

The EdenPURE® will also keep you healthy. That is because, unlike other heating sources, it will not reduce humidity or oxygen in the room.

The advanced spaceage EdenPURE® Infrared Portable Heater also heats the room evenly, wall-to-wall and floor-to-ceiling. And, as you know, most other portable heaters only heat an area a few feet around the heater.

Unlike other heating sources, the EdenPURE® cannot put poisonous carbon monoxide, any type of fumes or any type of harmful radiation into a room.

Q. What is the origin of this amazing heating element in the EdenPURE®?

A. This advanced heating element was discovered accidentally by a man named John Jones.

Q. What advantages does this advanced infrared heating process have over other heating source products?

Never be cold again

Cannot start a fire; a child or animal can touch or sit on it without harm

Pictured above is Bob Vila demonstrating the famous EdenPURE® GEN3 Model 1000 heater with a family. It saves big money on your heating bill while keeping you toasty warm with "heavenly heat".

A. This infrared heating process was designed around the three most important consumer benefits: economy, comfort, and safety.

In the EdenPURE® process, electricity is used to generate a type of infrared heat which, in turn, creates a very safe heat.

Q. How can a person cut their heating bill by up to 50% with the EdenPURE®?

A. The EdenPURE® will heat a room in minutes. Therefore, you can turn the heat down in your house to as low as 50 degrees, but the room you are occupying, which has the EdenPURE®, will be warm and comfortable. The EdenPURE® is portable. When you move to another room, it will quickly heat that room also. This can drastically cut heating bills, in some instances, by up to 50%.

End of interview.

The EdenPURE® will pay for itself in weeks. It will keep a great deal of extra money in a users pocket. Because of today's spiraling gas, oil, propane, and other energy costs, the EdenPURE® will provide even greater savings as the time goes by.

The EdenPURE® heater is now greatly improved. With no increase in price, the new EdenPURE® has been updated with the latest technology, safety, and comfort features to provide you with even greater comfort, more savings, and years of reliability. The EdenPURE® comes with a comprehensive three year warranty along with a 60-day no questions asked satisfaction guarantee – we pay the return shipping.

This product has been listed by Underwriters Laboratories.

Testimonials from a few of the millions of satisfied EdenPURE® customers

The EdenPURE® has cut my gas bill to a third of what it was last year. ***Leslie Wilson, Vancouver, WA***

The EdenPURE® really puts out the heat like a little solar furnace. It's below freezing outside and cozy warm in the rather over large living room area where I'm using it. I have already noticed a 40 to 60% drop in the cost of my heating bills. ***George B., Triangle, N.Y.***

How it works:

CUTAWAY VIEW
Heats floor to the same temperature as ceiling
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2. The infrared heat without combustion gently warms the cured copper baffles to create energized soft heat.
3. The soft heat rides the humidity in the room and provides moist, soft heat ceiling to floor, wall to wall without reducing oxygen or humidity.

SPECIAL READER'S DISCOUNT COUPON

The price of the EdenPURE® GEN3 Model 500 is $372 plus $17 shipping for a total of $389 delivered. The GEN3 Model 1000 is $472 plus $27 shipping and handling for a total of $499 delivered. People reading this publication get a $75 discount plus free shipping and handling and pay only $297 delivered for the GEN3 Model 500 and $397 delivered for the GEN3 Model 1000 if you order within 10 days. The EdenPURE® GEN3 comes in the decorator color of black with burled wood accent which goes with any decor. There is a strict limit of 3 units at the discount price - no exceptions please.

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- To order online, visit www.edenpure.com enter **Authorization Code: EHS1246**
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Shop-Proven Products

These woodworking wares passed our shop trials

About our product tests

We test hundreds of tools and accessories, but only those that earn at least three stars for performance make the final cut and appear in this section. Prices are current at the time of article production and do not include shipping, where applicable.

Ridgid replaces flagship tablesaw with a rock-solid winner

I've long thought highly of Ridgid's contractor-style tablesaws, but the company's new granite-topped hybrid model, the R4511, leaves those saws in the dust—and at an attractive price. The 1¼"-thick granite tabletop proved worth its weight by deadening vibration while workpieces glided smoothly across it during cuts. The closed cabinet on stubby legs—complete with Ridgid's built-in Herc-U-Lift mobile base with four swiveling casters—noticeably reduced the noise level and effectively channeled dust to the 4" port at the rear. I like its cabinet-mounted trunnions for easy top-to-blade alignment. Its 1½-hp motor surprised me by plowing through tough cuts—even bevel rips in 2"-thick hard maple—without bogging down.

If I could change anything about this saw, I'd beef up the 2"-tall, aluminum T-square-style rip fence with taller laminate-or UHMW-covered sideboards. And I like the quick-release splitter/blade-guard assembly, but to access it I had to first remove three screws in the throat insert.

(Just before we went to press, we learned that Ridgid had issued a recall for this saw to replace arbor shafts that could potentially break under heavy load. If you bought one of these saws before August 2009, call Ridgid at 866-539-1710 or go to ridgid.com to see if your saw qualifies for the recall.)

—Tested by Doug Hicks, a former shop teacher and woodworking magazine editor

Granite-Top Hybrid Tablesaw, #R4511

Performance	★★★★★
Price	$600

Ridgid
800-474-3443; ridgid.com

Heavyweight lathe turns in impressive showing

With Laguna's Platinum Series 18-47 lathe you can turn a workpiece up to 18" in diameter and 47" long. Despite turning a piece that large, I couldn't bog down its 2-hp, 220-volt motor no matter how hard I tried. I like its digital readout and electronic variable speed that ranges from zero to 3,200 rpm. And when finished shaping a workpiece, its reverse feature comes in handy: I was able to sand smoother than in just the forward rotation.

The heavy-duty cast-iron legs and ways (500 lbs total weight) eliminated vibration, even when I roughed out a near-capacity bowl blank. This machine sports many big-lathe features, including a 1¼"×8 tpi headstock spindle and 36 indexing stops, for a real-size price.

However, there's no handwheel on the headstock, and the locks for the headstock and tailstock sit on the back side of each, making it difficult to reach over to make adjustments. And it comes with a 6" faceplate, which works well for large turnings, but is just too big for medium to small bowls and vessels.

—Tested by Marlen Kemmet, Managing Editor

18" Wood Lathe, #A175017

Performance	★★★★☆
Price	$1,855

Laguna Tools
800-234-1976; lagunatools.com

Router-bit set makes no-canvas tambour doors

Few woodworking tasks prove more tedious and messy than gluing slats to canvas to make tambour roll-up doors. After making one years ago, I swore I'd never do it again. And premade tambours cost from about $60 for a bread box to nearly $200 for a desk. Now, thanks to Amana's three-piece tambour-door router-bit set, there's no glue or canvas involved. You simply shape the slats on a router table, and fit them together loosely in ball-and-socket-type joints, as shown at *bottom*.

The big profile bit routs both profiles of two slats onto one blank; the ball-tipped bit cuts the socket. The included ¼" round-over bit eases the sharp edges on the bottom slat. (Like many woodworkers, I already have a ¼" round-over bit, so Amana could leave this bit out of the set to make it more affordable.) Rip the two slats apart on your tablesaw, and then fit them together. The finished door slides best in a 5/16" groove; if you don't have a bit that size, rout it in two passes with a smaller one.

—Tested by Erv Roberts, who has been building projects and testing tools for WOOD® *magazine for 18 years.*

Tambour Door Router Bit Set, #54314

Performance	★★★★★
Price	$175

Amana Tool Co.,
800-445-0077, amanatool.com

continued on page 74

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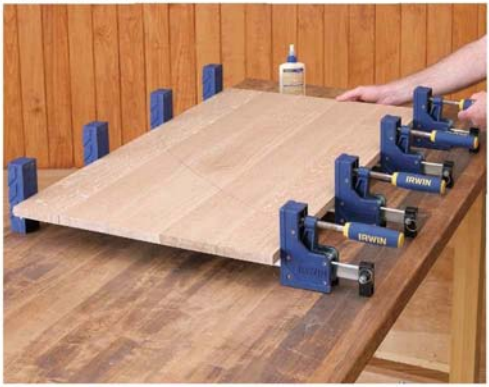
Irwin's beefy clamps turn in weighty performance

I've relied on Irwin Quick-Grip one-handed bar clamps for years, so I looked forward to using Irwin's parallel-jaw clamps. The steel-reinforced jaws and thick steel I-beam bar did not flex under pressure. But at 6½ lbs for the 24" clamps and 9 lbs for each 48" model, the heft adds up when you move a clamped assembly off your bench. The movable jaws dig into the smooth bars when tightened, leaving bite marks that impede movement on later glue-ups. And the fine handle threads require more turns to tighten and loosen than most other parallel-jaw clamps.

—Tested by Bob Hunter, Tools & Techniques Editor



Parallel-Jaw Clamps

Performance		★★★☆☆
Price	24" clamp, #2026500	$35
	48" clamp, #2026501	$45

Irwin Industrial Tools
800-464-7946; irwin.com

continued on page 76

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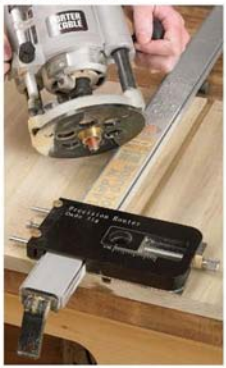

—Tested by Jon Svec, a former project editor and builder at WOOD® magazine.

Precision Router Dado Jig, #PDJ-100

Performance ★★★★★
Price $90
Infinity Cutting Tools
877-872-2487; infinitytools.com

Contour sanders lay down smooth grooves

Auto-body repair shops have used stiff-foam (similar to swimming-pool "noodles") Soft-Sanders for years, but only recently did these contour-sanding accessories find their way into wood-working shops. The kit features six distinctly shaped sanding pads in three densities and includes 80-, 120-, and 180-grit adhesive-backed sandpaper.

I began my testing by sanding a length of home-center red-oak crown molding. I used three pads to match the different molding contours, and worked my way through the three grits to produce a slippery-smooth surface.

Next, I went to work on a cabinet-door raised panel. It took only one pad to match the large cove. To test the contour pad's effectiveness, I scribbled pencil lines all along the profile. At first, the abrasive missed the apex of the cove, but I applied a little more pressure and it flexed enough to get that, too.

I had less success on small routed profiles (ogees, beads, etc.). Getting sandpaper to conform to those small shapes proved too difficult, rounding-over crisp corners instead.

The supplied sandpaper sticks to the pads well during sanding, yet peels off easily when changing grits. It proved durable as I folded, wadded, and twisted it into various forms, and it did not load up with dust or pitch.

—Tested by Bob Hunter, Tools & Techniques Editor

Soft-Sanders

Performance ★★★★☆
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Hidden hazards could lurk in broken blades

Q: I dropped my premium tablesaw blade on the concrete and the carbide broke off of a tooth. Can I keep using it?

—Todd Hubbard, Oakland, Calif.

A: Short answer, Todd: no. Besides the obviously damaged tooth, other teeth may have sustained invisible damage. The next use could turn that carbide into dangerous shrapnel.

But is there any way to salvage your investment? We called several premium blade manufacturers posing as customers to see what our options were.

Not surprisingly, bouncing a blade off of concrete instantly voids the warranty—so there would be no free replacement. And companies offered few alternatives beyond purchasing a new blade. When prompted, most agreed that a local sharpening service might be able to replace the carbide tip less expensively than replacing the blade.

The representative of one manufacturer, Forrest Manufacturing, asked us to send in the broken blade. They offered to check the surrounding teeth for damage, replace missing carbide tips, straighten any bent teeth, and make a test cut to ensure everything was in order. They directed us to their online price list, which had a detailed listing of their fees for these services. In addition to shipping costs, carbide tip replacement starts at $7 for one tooth down to $3 each for four or more teeth. A test cut checking for bent teeth costs an additional $2.50 and straightening any bent teeth costs $2.50 per tooth.

Hidden damage could equal dangerous shrapnel if this broken blade is used again before being properly repaired.

Surgery for broken screws

Q: While I was installing hinges on a cabinet door, the head of a brass screw broke off. How can I remove the screw without making a mess of my project?

—Kenneth Hill, Troy, Mich.

A: The tool you're looking for, Kenneth, is a broken screw extractor. (To buy one search for "screw extractor" at woodcraft.com.) When installed in a drill, these diminutive hole saws cut a removable plug of wood from around the threaded shaft of the broken screw. Because their outer diameters match common plug-cutter sizes, you simply fill the hole with a plug cut from a scrap of the same wood, hiding the mistake. One word of caution: Don't overtighten the chuck when inserting the extractor in your drill, as you could crush the tube.

Brass screws are fragile. On your next attempt, be sure to pre-drill a properly sized pilot hole. Then drive and remove a steel screw of the same size and thread count to plow the way for the brass screw. Finally, tighten the brass screw by hand with a screwdriver to avoid twisting off the head.

continued on page 80

Time travel at the speed of a 1935 Speedster?

The 1930s brought unprecedented innovation in machine-age technology and materials. Industrial designers from the auto industry translated the principles of aerodynamics and streamlining into everyday objects like radios and toasters. It was also a decade when an unequaled variety of watch cases and movements came into being. In lieu of hands to tell time, one such complication, called a jumping mechanism, utilized numerals on a disc viewed through a window. With its striking resemblance to the dashboard gauges and radio dials of the decade, the jump hour watch was indeed "in tune" with the times!

The Stauer *1930s Dashtronic* deftly blends the modern functionality of a 21-jewel automatic movement and 3-ATM water resistance with the distinctive, retro look of a jumping display (not an actual jumping complication). The stainless steel 1 1/2" case is complemented with a black alligator-embossed leather band. The band is 9 1/2" long and will fit a 7–8 1/2" wrist.

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Ask WOOD

Shedding some light on fixture placement

Q: I'm in the process of completing my new shop at home, and I have a load of fluorescent lights to install. How should I space them for best effect?

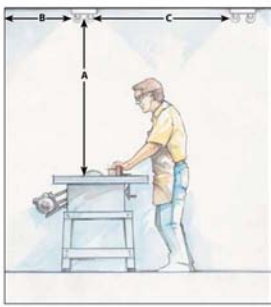
—Bob Crain, Spring Valley, N.Y.

A: Congratulations on your new shop, Bob. You need to create adequate illumination that overlaps to eliminate shadows or dark corners. Referring to the drawing, *below*, here are some simple rules for doing just that.

Start by measuring the height (A) from your work surfaces to the expected height of the light fixtures. Assuming you plan to install your fixtures in unbroken rows across the ceiling, the distance from the outermost fixture to the wall (B) should be about one half the distance of (A). The distance between fixtures (C) should be about 1–1½ times (A).

For example, a typical 24×24' shop with a 10' ceiling and 36"-high work surfaces gives you a distance of 7' for (A). Three 16' rows of lights (each consisting of two 8' fixtures or four 4' fixtures) spaced 8' apart (C) leaves 4' all around from fixture to wall (B).

Some shadows can't be avoided, so add task lighting where needed to take care of any workstations that are still in shadow.



Dead-on dowels dilemma

Q: Where can I get properly sized dowels? When I buy ¾" dowels, they always seem to be slightly undersized.

—Mike Chester, Champlin, Minn.

A: Look no further than your router table, Mike. Start with your choice of dry, straight-grained stock to avoid the curling you often see in store-bought dowels. Joint and plane a blank down to the dowel's diameter—in your case ¾ × ¾" square—then cut it about 3" longer than the dowel you will need.

Install a round-over bit with a radius half that of your dowel blank—⅜" for your ¾" dowel stock. Set the fence flush to the bit's bearing. Then, set the bit height to make an even roundover in your stock. Make a test roundover on a cutoff to verify your setup.

Mark start and stop lines on all four faces of the blank about 1" from each end. By routing between these marks, you keep the ends square to act as guides. After each pass rotate the blank 90° for the next pass. Finally cut off the square ends and cut the dowel to length on your bandsaw.

continued on page 82

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Ask WOOD

A pound of panel-busting prevention

Q: After reading about the effects of moisture on wood movement, I'm reluctant to try tablesawn raised panels. Won't the wedged edges of the panel spread the grooved stile to the breaking point, especially on wide panels?

—Michael Boles, Columbus, Ohio

A: Fortunately, Michael, time-tested, raised-panel construction absorbs the often punishing effects of seasonal wood movement by capturing the movement-prone panel in a forgiving frame. The wedged edges of Shaker-style, tablesawn panels might be a little less forgiving than other designs, but the steps to avoid wood movement catastrophes are the same.

First, make your panel from straight-grained, rift-sawn or quartersawn wood that has been properly kiln-dried—which is less prone to movement than cathedral-grained wood. Once in your shop, let the wood acclimate for a couple weeks before machining it. This allows the wood's moisture content to stabilize with its surroundings.

After measuring between the grooves in the rails and stiles, cut the raised panel to leave at least a ⅛" gap on all sides. This leaves the panel free to shrink and swell with the changing humidity of the seasons. To avoid a loose or rattling panel, install flexible spacers, such as "Space Balls" (Woodcraft #142284, $6/package of 100, 800-225-1153, woodcraft.com), in the grooves, or glue or pin-nail the top and bottom center of the panel in the rail. For panels 18" or more wide, or if the piece will experience drastic changes in humidity, such as a cross-country trip from Arizona to Florida, deepen the grooves and/or narrow the panel to allow for even more swelling.

The wedge shape of a tablesawn raised panel is less forgiving of wood movement without planning for its effects.

Finally, panel shrinkage might expose a slight gap between the panel profile and the stile groove in tablesawn panels, so stain and finish the panel before inserting it in the frame to avoid a distracting unstained line.

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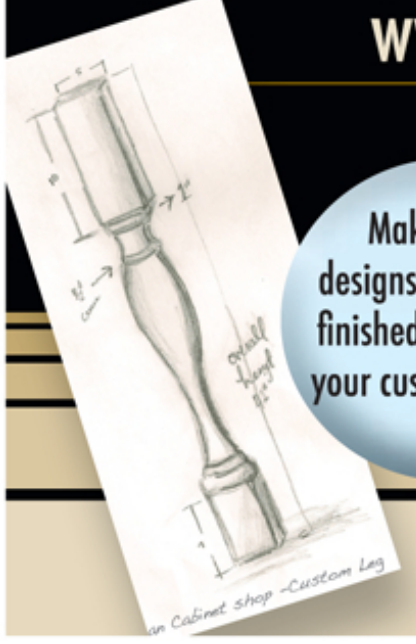

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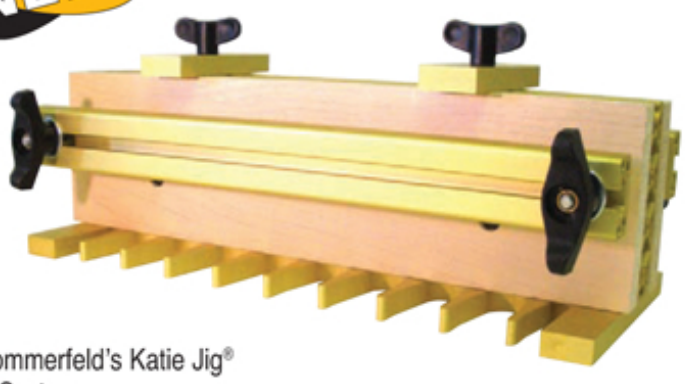

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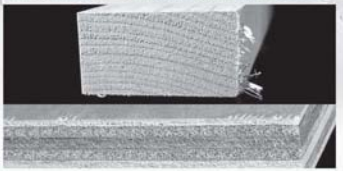

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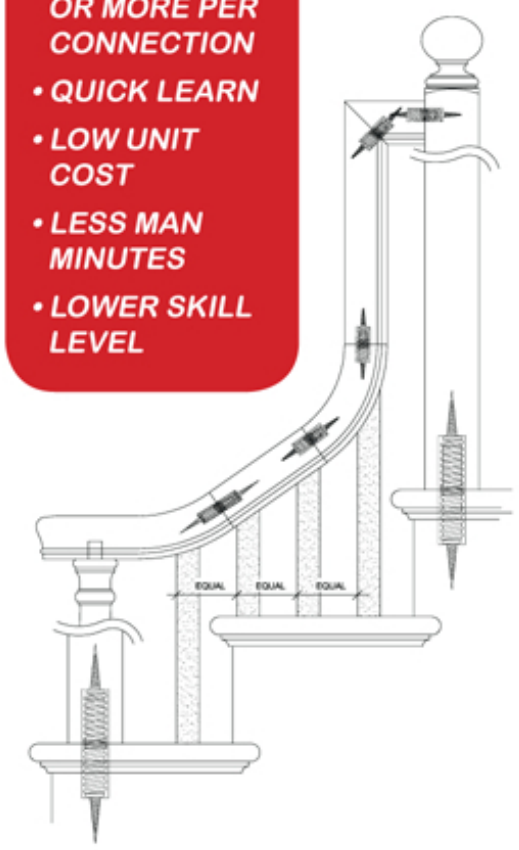

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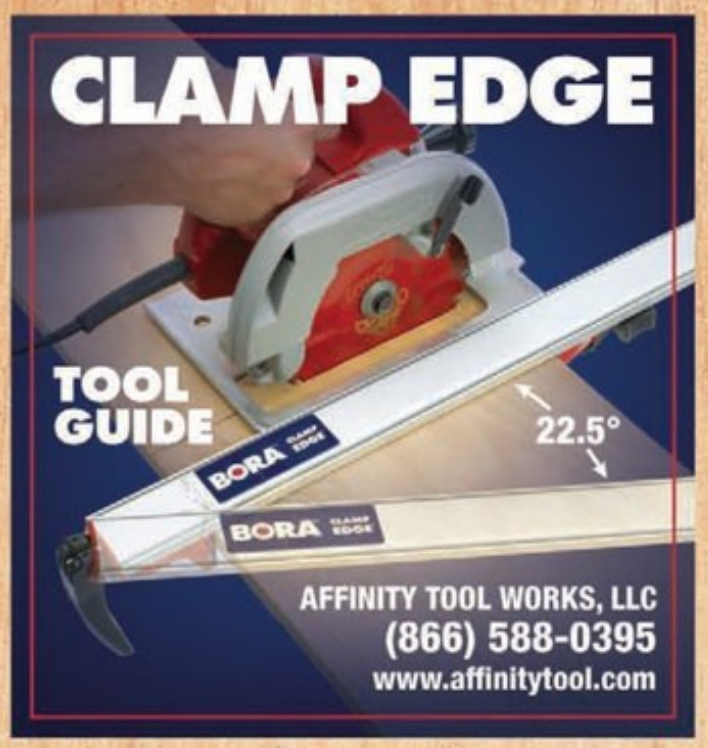

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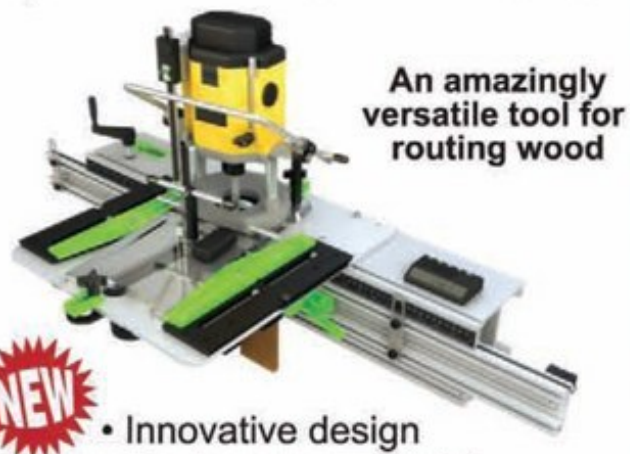

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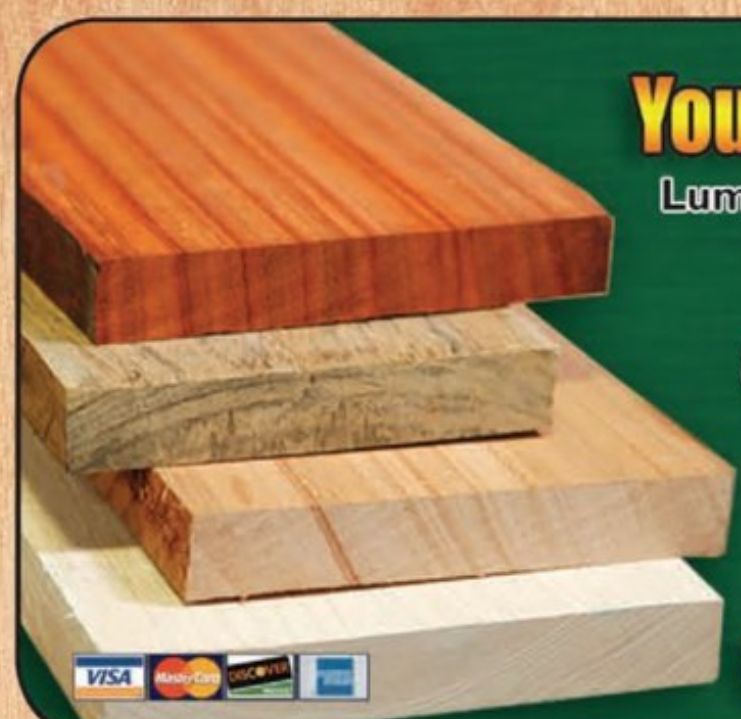

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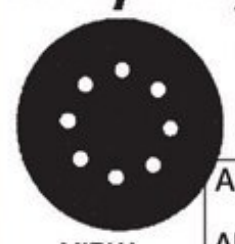

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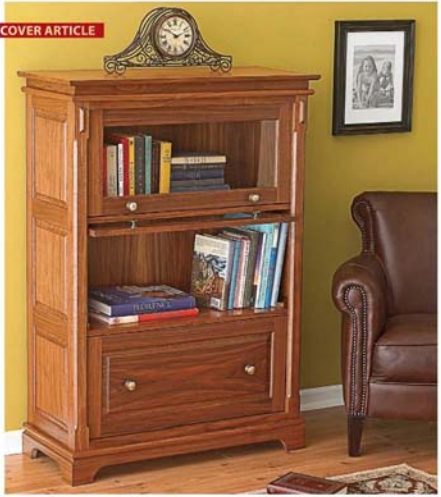

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